Operationalizing Cultural Warrant in Knowledge Organization

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Abstract

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Data representation of diverse cultures, perspectives, and identities has stepped to the fore in society, especially with the academy's increasing attention to diversity, equity, and inclusion. The failure to provide descriptions that are inclusive to diverse cultures and perspectives can hinder information access and raise ethical concerns. Information scientists and information professionals have identified problematic data representations and have advocated for changes to include diverse cultures, perspectives, and identities. Scholars have recognized various ways culture can manifest in knowledge organization (KO), such as through classifications, categories, and subjects. Previous studies use the concept of warrant, the justifications for classificatory decisions, to discuss the rationales for developing and applying KO standards. Cultural warrant is one of these warrants, and it is an approach to consciously account for culture in classification. In this dissertation, I expand the application of warrants from classificatory decisions to

knowledge organization decisions writ large, including cataloging and data description. While culture is recognized as one of the forces that shape data work and KO, little work has thoroughly examined the observable manifestations of the concept of culture in KO. As a result, information scientists and information professionals are constantly reacting to issues caused by the lack of culturally inclusive data organization and description. To date we are yet to prevent the influx of bias and misnaming into information systems. The goal of this dissertation is to fill this gap by operationalizing cultural warrant in KO. Through analyzing editorial documents of KO standards developed at different times, in languages, and regions, and through prolonged ethnographic fieldwork, observing cataloging practices, I present an in-depth analysis of culture in KO. The dissertation provides concrete examples from literature, standards, and practices about how culture is woven into multiple aspects of data representations and KO, such as the development, application, and evaluation of KO standards and data practices. To operationalize cultural warrant, I propose three research questions. RQ1: How is culture identified in the knowledge organization literature? RQ2: How is culture manifested in knowledge organization standards? RQ3: How is culture manifested in cataloging practices? Through answering these research questions, the dissertation identifies prominent manifestations of culture that are common across standards and practices in KO, including conflicts and prioritizations of warrants, levels of standards and standardization, forms of resistance, and resources being cultural. These manifestations of cultural warrant reflect the perspectives of scholars, KO standard developers, and information professionals. Ultimately, this dissertation presents a literature-informed discussion highlighting specific dimensions of culture that are relevant to cultural warrant, an inventory of sources of cultural influences in KO, a list of manifestations of cultural warrant, and an explanation of how they play out. These deliverables provide scholars

precise terms to identify, examine, and discuss cultural influences and cultural warrant in KO. Furthermore, by advancing our understanding of cultural warrant in KO, we gain insight into how and where to change our practices and standards in order to improve cultural inclusivity and create ethical data representations and KO systems.

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1. Introduction

Cultural Influences in Knowledge Organization

There have been shifts of theoretical stances in knowledge organization studies: from the singular universe of knowledge perspective to the pluralistic understanding perspective, and beyond. These theoretical stances influence the focus of study in the domain. The universe of knowledge stance pursues one ideal and universal classification. The pluralistic understanding perspective acknowledges that classifications, concepts, categories, meanings, and subjects are determined by the historical, social, and cultural context of the user communities. In pluralism, a classification presents one of the many possible ways of organizing knowledge, and it may serve particular users in certain contexts. Some scholars take this a step further and see classification as active change agents for interpretations and work practices. Through the shifts of theoretical stances, there has been increasing emphasis on the social and cultural influences in knowledge organization (Feinberg, 2007; Leazer, Montoya, & Furner, 2018; Mai, 2004; 2009; Miksa, 1998; Smiraglia, 2014). For instance, among the variant *warrants*, which means the justifications for classificatory decisions, Beghtol (1986) identifies *cultural warrant* as one of the warrants that require further exploration. Culture, along with literature, users, policies, etc., is a source of influence that shapes and justifies classificatory decisions. This is affirmed by many studies. López-Huertas (2008) highlights how different cultures present the same subject differently by comparing the knowledge representations and organizations of gender studies in Spain and Uruguay, and examining the classifications of musical instruments in three cultural regions (López-Huertas, 1997; 2013). These are examples of cultural warrant. Furthermore, we see cultural influences expand beyond

classification and affect multiple aspects of knowledge organization, such as terminology, concept identification, naming, categorization, focus of themes, and citation order. The influences of culture become more prominent when combined with temporal influences. Lee (2016) uses the first Chinese catalog, the *Seven Epitomes*, as an example to highlight cultural and temporal influences in concepts that are pertinent to knowledge organization, such as authorship.

Besides studying cultural influences in knowledge organization, previous studies also recognize the influences between cultures and knowledge organization are mutual. Knowledge organization standards like classification schemes and controlled vocabularies can reinforce or marginalize cultures by including or excluding cultural perspectives (Olson, 2000). Instead of pursuing an *objective* standard, many scholars advocate for ethical classifications, multi-perspective knowledge organization systems, and inclusive data representations that value culture and context. The perspectives and cultures may cover a range of topics such as race, gender, and ethnicity (Adler, 2017; Bowker & Star, 2000; Duarte & Belarde-Lewis, 2015; Furner, 2007; Littletree et al., 2020; Mai, 2013; Matsuda, 2017; McIlwain, 2020; Noble, 2018).

Related to this camp of thoughts, some studies focus on the tension between globalization and localization of knowledge organization standards. The global-local tension presents the challenges to include and present multiple perspectives in one standard or system. For example, Bednareks (2007) compares the U.S. centric Library of Congress Classification (LCC) with the Māori perspective to highlight epistemological and cultural differences between a global standard and the local worldview. Similarly, Diao and Cao (2016) examine cultural issues of applying the LCC to Chinese archaeological reports. The development of the New Classification Scheme for Chinese

Libraries (CCL) in Taiwan and the Nippon Decimal Classification (NDC) in Japan are two cases that emphasize cultural concerns and global-local tensions in classification. On one hand, the editors of the first edition of both schemes discuss the motivations of adopting the Dewey Decimal Classification (DDC), a well-established international scheme at the time. On the other hand, they both emphasize the necessity to develop a localized scheme which incorporates local cultures and user needs into scheme design (Liu, 1929; Mori, 1929). Similarly, Marten (2006) presents how the National Indian Law Library migrated from an in-house subject heading list to the Library of Congress Subject Headings (LCSH), but retained some headings in the in-house list that are more specific and preferred over LCSH. This is an example of mitigating the global-local tension through adopting an international standard with some localization as supplements to serve local communities.

The consequences of cultural influences and global-local tension in knowledge organization raise ethical concerns. For instance, some scholars examine the representation of others in knowledge organization. Duarte and Belarde-Lewis (2015) surface problematic cataloging practices, such as misnaming, euphemisms in descriptions, and the superiority of text-based systems over other ways of knowing. They propose possible approaches to decolonize resource descriptions and create spaces for indigenous ontologies. Adler (2017) presents an analysis of how the Library of Congress classifies and catalogs categories of difference, such as sexual perversion. To address ethical issues such as exclusion and misrepresentation, some scholars call for multi-perspective classifications. However, there are still questions and challenges pending for discussion. If the purpose of multi-perspective classification is to present voices from different perspectives instead of promoting one voice and silencing others, does the proportion of perspectives matter? To qualify as a perspective

in a multi-perspective classification, to what extent should a perspective be presented? Is a classification with one dominant perspective and limited instances of other perspectives considered a multi-perspective classification? Further, how do we technically accommodate multiple perspectives in one classification? If we consider classification as having mutually exclusive classes and assigning only one place for one thing, there should only be one arrangement for each class, despite the various possible conceptual arrangements. If we include different perspectives, so one thing may be classified under multiple classes, is the end product a multi-perspective "*classification*?" (Lee, 2017a). Besides classification, scholars advocate for multi-perspective knowledge organization in general. As Guimarães et al. (2016) present, Gutiérrez (2002) advocates for reordering knowledge based on critical theory and hermeneutics, so that no one discourse, cognitive process, culture, or user is privileged over others. Hudon (1997) emphasizes the importance of multilingual thesaurus with appropriate semantic structures. Tools like this can support multilingual resource description, representation, and access, and improve equal access to quality information. Beghtol (2002a) calls for *cultural hospitality* in knowledge organization systems. A system should not only add concepts appropriately but also connect concepts and cultures with existing knowledge with correct relationships. These studies present examples of ethical issues in knowledge organization of many forms of *others*.

Some scholars address ethical concerns resulting from globalization and digitization. As Leazer et al. (2018) point out, globalization further marginalizes indigenous cultures and languages, and digitization leads to concentration of media ownership. Failing to provide fair and open information access to different user groups is an ethical concern. Some scholars argue for the importance of engaged and practice-based knowledge organization to avoid harm and ethical

issues. Mai (2013) points out the favoring of neutrality and objectivity in the codes of ethics of librarianship, and argues that this could cause harm and raise ethical issues. He proposes practice-based ethics, which allows contextual ethical judgments. Tennis (2013) elaborates on the importance of engaged knowledge organization and how the failure of doing so could cause harm. Some scholars look beyond bibliographic classifications, and discuss ethical concerns in different types of knowledge organization systems. Bowker and Star (2000) examine ethical issues and embedded biases in classifications, such as the international classification of diseases and race classifications. Besides classifications, Smiraglia (2014) points out that information objects are cultural, and the information sharing process is a cultural activity that propagates the foundations of cultures. There are many sources of cultural forces, and cultural influences can shape knowledge organization, including the way of knowing and the system of knowledge. Littletree et al. (2020) lay out the colonial history of knowledge organization, and introduce an indigenous system of knowledge conceptual model. The model emphasizes relationality, holism, peoplehood, as well as respect, responsibility, and reciprocity. The differences between the core concepts of their model and the principles of knowledge organization in the Western tradition call for reflections on providing ethical resource descriptions and representations. Besides these themes, Smiraglia (2014) lays out four cultural synergies among information institutions. The synergies focus on how culture is reflected in the information objects, information process, cross- or meta-institutional curation, as well as the core ethical standards for information. The themes and synergies highlight the components of knowledge organization that intersect with culture. In this dissertation, I will identify and use themes like these to surface different dimensions and manifestations of cultural influences in knowledge organization.

Operationalize Cultural Warrant in Knowledge Organization

With increasing emphasis on cultural influences in knowledge organization and advocacy of ethical and inclusive knowledge representation, I focus on operationalizing *cultural warrant*. Warrant is the rationalization for classificatory decisions, such as the inclusion and exclusion of concepts in classifications (Feinberg, 2010; Tennis, 2005). *Cultural warrant* means culture is a source of justification for classificatory decisions (Beghtol, 1986, 2002, 2005). The motivations for operationalizing cultural warrant are the lack of definition and operationalization of cultural warrant, and the scope of influence of cultural warrant.

Multiple sources of cultural input (e.g., language) may contribute to cultural influences, and cultural influences may manifest in knowledge organization in various ways. For example, culture may influence what data is represented and what is not in any given knowledge organization system. Further, concepts that are related to knowledge organization, such as authorship, may have different definitions between cultures. In ancient China, technicians who create stone rubbings were not considered creators, so their names were often not documented. If we describe stone rubbings following RDA (Resource Description and Access), the current international cataloging rules, the omission of a technician's information becomes a lack of a creator's information. This is an example of how cultural influences could shape resource descriptions, even the necessity to document particular information (Lee, 2018). Examining cultural influences helps us trace the sources of cultural input to knowledge organization. *Cultural warrant*, on the other hand, is a conscious move. Classificationists and information professionals deliberately account for culture when developing and applying classification schemes. There are different ways to demonstrate cultural warrant. For example, in the first edition of the Nippon Decimal Classification (NDC) and

the first edition of the New Classification Scheme for Chinese Libraries (CCL), both editors emphasize the issues of fully adopting the Dewey Decimal Classification (DDC). Mori (1929) mentions the need to prioritize Japanese works in the NDC. Liu (1929) crafts a culturally appropriate class sequence by referencing traditional Chinese classifications and elaborating his interpretation of the relationships between classes. Both editors accounted for cultural warrant and used it in the design of their schemes.

The goal of this study is to operationalize *cultural warrant* by identifying the approaches of realizing cultural warrant in knowledge organization standards and practices. Cultural warrant was chosen for examination because of three reasons. First, despite recognizing the importance of culture, Beghtol (1986, 2002, 2005) did not specify what culture means in cultural warrant and how cultural warrant manifests in knowledge organization. Without operationalizing cultural warrant, it is challenging to expand discussions beyond conceptual debates. The second reason is because of how the use of cultural warrant as a concept is deployed in knowledge organization literature. Cultural warrant is discussed, and its importance recognized (Barité, 2018; Dryden, 2005; Kwasnik, 2010; Martínez-Ávila & Budd, 2017). However, the concepts of cultural warrant and culture are rarely defined. Smiraglia (2014) is one exception that provides a definition of culture. The third reason is the scope of influence of cultural warrant. Cultural warrant could affect multiple aspects of the knowledge organization process. Besides applying classification schemes, the examples of the CCL and the NDC show how cultural warrant influences the development and localization of classification schemes. In addition, the influence of cultural warrant may extend to the evaluation of knowledge organization processes. As Bowker and Star (2000) point out, the intended use of a standard may not match its usage in practice. While designers may incorporate

cultural warrant in knowledge organization standards, the effectiveness of the approaches may differ in application. To evaluate a knowledge organization standard, we may want to examine how cultural warrant has been embedded in the standard (i.e., how cultural warrant was operationalized) and how effective different manifestations of cultural warrant are in different contexts. Further, we can extend what we learn from operationalizing cultural warrant to knowledge organization in general. While the definition of cultural warrant focuses on classification, our understanding of the sources of cultural influences and the prominent manifestations of culture in classification could provide insight into cultural influences in knowledge organization. The operationalization of cultural warrant is crucial for (1) expanding discussions beyond the conceptual level, (2) clarifying the meaning of the term to improve communications, and (3) identifying specific criteria for the development and evaluation of knowledge organization standards and practices.

To operationalize cultural warrant, I pose three research questions. RQ1: How is culture identified in the knowledge organization literature? RQ2: How is culture manifested in knowledge organization standards? RQ3: How is culture manifested in cataloging practices?

For **RQ1: How is culture identified in the knowledge organization literature?**, I will extend on my previous work (Lee, 2015), which focuses on reviewing knowledge organization literature and anthropology literature in English and European contexts. The review shows that culture is a complex concept with multiple dimensions. Instead of boldly defining culture, previous studies capture characteristics of culture by providing non-comprehensive lists of manifestations and elements of culture (Geertz, 1973; Goodenough, 1971; Hofstede, 1991; Kluckhohn, 1949; Menou,

1983; Olson, 2000; Steinwachs, 1999; Taheri et al., 2014; Tylor, 1958). While some conceptual tenets were identified from the literature, the result cannot provide a satisfactory answer to: what do we mean when we talk about culture in knowledge organization?

When a concept is too broad and includes too many meanings, it becomes a convenient referent to which people can gesture without specifying their focus (Lidov, 1998). Using *culture* without specification leads to the assumption, and sometimes illusion, of shared understanding. Without vocabulary for the particular dimensions of culture, it remains challenging to identify different cultural influences and manifestations of culture in knowledge organization. For instance, Taheri et al. (2014) discuss the challenges of designing a switch language for a blend of Iranian culture and Islamic culture. The discussion covers nation, language, and religion. Readers' interpretation is required to infer the meaning of culture and identify the dimensions involved. Adding to the complexity, the dimensions of culture may have different boundaries. The national border of Iran, the areas that use the Persian language, and the places that practice Islam are overlapped but different. The lack of specification of *culture* could lead to an illusion of harmony. For example, *cultural warrant* emphasizes accounting for *culture* in classificatory decisions. However, it remains unclear what cultures and who's cultures are accounted for. There are multiple stakeholders in the knowledge organization process (e.g., general users, catalogers, classificationists); and there are multiple cultures coexist within the same group, and even within an individual (Patterson, 2014). Without specification, the use of *culture* may depict an illusion of one shared culture, or indicate the emphasis of one mainstream culture without clarifying what that is. This risks downplaying the complexity of cultures and ignoring diversity and ethical concerns that arise from prioritizing one culture over others. The need of specifying different

dimensions of culture is also patently observed in cataloging practices. In the knowledge organization process, many components and things are cultural, but in different ways (Lee, 2017b, 2019). For instance, there are cultural influences in the resources described, in the knowledge organization standards, and in the catalogers that interpret and use the standards to create resource descriptions. A knowledge organization standard (e.g., Library of Congress Subject Headings) may fail to faithfully describe a resource (e.g., Chinese stone rubbings). A U.S. trained cataloger and a cataloger from China hold different cataloging rationales, which reflect the institutions and cataloging communities they are affiliated with. These observations showcase how cultural influences may manifest in the knowledge organization process in different forms. Using *culture* as an umbrella term without specifying particular dimensions is imprecise and risks causing confusion and misunderstanding. Besides acknowledging cultural influences in knowledge organization, we can go one step further and compile a set of specific vocabularies for different dimensions of culture. The operationalization of cultural warrant can serve as the base for in-depth exploration and discussion of cultural influences in knowledge organization.

While the focus of this review is on culture in the knowledge organization context, based on the previous work, many knowledge organization studies do not provide a definition of culture. As a supplement, I will review some anthropology and sociology studies on culture. This will not be a comprehensive review, but it will present an overview of a variety of definitions, elements, characteristics, and manifestations of culture. Based on this review, I will present my working definition of culture in knowledge organization. Also, through literature review, I will identify some prominent concepts as analytical tools for RQ2.

To answer **RQ2: How is culture manifested in knowledge organization standards?**, I will do content analysis of the editorial documents of three knowledge organization standards using the analytical tools identified in RQ1. The analytical tools, such as activity theory, classification as infrastructure, and global-local tensions, will serve as codes for qualitative coding and help identify cultural influences in the three standards. The three standards are CCL (New Classification Scheme for Chinese Libraries), NDC (Nippon Decimal Classification), and RDA (Resource Description and Access). CCL and NDC are classification schemes localized from international standards, and RDA is an international cataloging guideline. Details about the analytical tools, coding, and rationales of selecting the three standards will be discussed in the Methodology section. This research question focuses on editorial documents of the standards to capture editors' perspectives and intentions, and the role of culture in developing the standards.

For **RQ3: How is culture manifested in cataloging practices?**, I will analyze the fieldnotes of my ethnographic study on *culture and knowledge organization*. Since 2015, I started this ethnographic study to explore manifestations of culture in cataloging practices. By participatory observations and informal interviews of catalogers in an academic library, I collected rich cataloging scenarios. The scenarios provide real-world examples and allow me to investigate how culture influences multiple components in the knowledge organization process.

Through literature review, content analysis of editorial documents of knowledge organization standards, and ethnographic observations of cataloging practices, I will identify manifestations of cultural warrant and cultural influences in knowledge organization. The result will reflect the perspectives from scholars, knowledge organization standard developers, and catalogers. The

deliverables of this study will include (1) a literature review highlighting specific dimensions of culture that are relevant to cultural warrant, (2) an inventory of sources of cultural influences in knowledge organization, and (3) a list of manifestations of cultural warrant and an explanation of how it plays out in knowledge organization. The deliverables will provide scholars precise terms to identify, examine, and discuss cultural influences and cultural warrant in knowledge organization. For instance, when we discuss cultural warrant in a knowledge organization process, we would have vocabularies to specify the sources of cultural influences, the manifestations of cultural warrant in systems, and the dimensions of culture that are taken into account in the knowledge organization process. The deliverables may also contribute to the evaluation of knowledge organization standards. For example, we might need criteria to evaluate the cultural hospitality (i.e., the accounting of cultural warrant by designers of a knowledge organization standard) of a standard. With the dimensions and sources of culture specified, we can further examine the strengths and weaknesses of different manifestations of cultural warrant. The study would contribute to an increase of granularity in the vocabulary we use for cultural influences and cultural warrant in knowledge organization. This is a step toward improving cultural hospitality and inclusion in knowledge organization.

2. Literature Review

This literature review is based on discussions of culture in the knowledge organization literature, and supplemented with some anthropology and sociology literature. To better present the review, I group definitions of culture into families of definitions of culture, and introduce the components, manifestations, and characteristics of culture identified in the literature. Subsequently, I shift the focus from the concept of culture to culture in the knowledge organization context, especially in the form of cultural warrant.

Culture: a meta-concept

> "*Culture is a deeply compromised concept that I cannot yet do without.*" (Clifford, 1988, 10).

As Clifford (1988) states, we use the concept of culture while acknowledging its compromised nature. What makes culture a "deeply compromised concept?" While there might be many reasons, culture being a meta-concept contributes to its complexity. Culture is a meta-concept that serves as a building block for other concepts. We can identify cultural components or cultural influences in concepts such as economics and politics. Culture is an abstract concept that is embedded in manifestations of variant forms, that is, in observable phenomena or artifacts. We may recognize culture when we see it, but it is difficult to encompass all components and characteristics of culture in one definition. As a meta-concept, culture seems ubiquitous. We can identify cultural influences in resources, technologies, standards, designs, practices, etc. (Bednareks, 2007; Bowker & Star, 2000; Mai, 2013; Moulaison, 2010; White & Choemprayong, 2019). However, things could be cultural in different ways. For example, we may consider a human-created artifact cultural, as it contrasts with natural objects. We may also consider a tradition as cultural, because it is a shared

belief or behavioral pattern in a community. While both the artifact and the tradition are cultural, they might not share the same set of characteristics. The ambiguity of culture results in great variances among things that are considered cultural.

Despite the ambiguity, we cannot yet do without the concept of culture. As a meta-concept, culture is influential to many concepts. Different disciplines study culture and need this concept to discuss the complex whole that encompasses the cultural components and characteristics in various contexts. To gain a better understanding of the concept of culture, the answer to the first research question of this dissertation presents a literature review of the knowledge organization, anthropology, and sociology literature in English, European, Chinese, and Taiwanese contexts. The literature review focuses specifically on the definitions, components, characteristics, and manifestations of culture from studies across the domains listed above. Although I cannot offer one definition of culture or guarantee a comprehensive review, the literature review gives us a sense of what culture is by collecting variant descriptions of culture. In addition, through the literature review, I identify concepts that are closely related to culture and use them as analytical tools for addressing RQ2. In doing so, we come closer to operationalizing cultural warrant.

Families of Definitions of Culture

For the ease of presentation, I group the definitions of culture into non-mutually exclusive families. These families of definitions are not the only possible grouping, and the definitions in the same family are similar at a general level but often different if we look into more details. However, the grouping is helpful in highlighting different focuses and dimensions of culture.

Culture as Context -- where meanings are generated and used

The first family of definition is culture as context. To explain what culture as context means, some scholars describe culture as system(s) of symbols where symbols can be thickly described (Geertz, 1973; Williams, 2014). In a similar sense, culture is described as a sphere for the production, circulation, and use of meanings (Sewell, 1999), or a shared system of habits and values (Harrell & Huang, 1994), or concrete and bounded body of beliefs and practices (Sewell, 1999), or a particular way of life (Williams, 2014, 55), or a complex conceptual universe (Gomes & da Cunha Frota, 2019). While the metaphors differ, a common theme is that culture is the setting for meanings. Treating culture as context emphasizes the role of setting in interpreting meanings. For example, a behavior may have different meanings depending on the person who conducts the behavior, the timing, the locale, etc. Culture as context refers to the factors that may influence the meanings of concepts and behaviors. In this sense, the boundaries and scales of cultures vary. Culture may refer to the state, as national culture (Taheri et al., 2014). Culture may refer to the economy, as market culture. Culture may refer to a business firm, such as an organizational culture. Culture may also refer to epistemic culture, the aggregate patterns and dynamics of knowing in a setting of expertise, such as discipline or scientific specialty (Knorr-Cetina, 1999, p.8-10). Despite the variant scopes, culture is where meanings are generated and used.

Culture as Collective Phenomena -- shared among a group of people

The second family of definition is culture as collective phenomena. In this sense, culture is shared in a group through learning from other members (Goodenough, 1971; Hofstede, 1994; Kluckhohn, 1944; Lee, 2015; Steinwachs, 1999; Tylor, 1958) or inheriting from the previous generations (Hsueh & Wu, 2011). What is shared, however, varies in definitions. Some definitions treat culture

as the shared assumptions, such as values and beliefs, that shape how and what the cultural group members do. For example, Smiraglia (2014) defines culture as the shared base of knowledge among a group of people that shapes their perceptions and behaviors, both as a group and as individual members of the group. Patterson (2014) identifies two components of culture, and one of which is the shared knowledge structures that are collectively made, reproduced, and unevenly shared. The knowledge structures provide predictability and meaning of human behaviors. One other example is treating culture as the shared ideal type of behaviors, such as rules, guides, expectations, and judgement of behaviors in group members' minds that shape their behaviors and identities (Goodenough, 1971; Steinwachs, 1999). Some definitions see culture as the shared behaviors or behavioral patterns. The configuration approach in cultural anthropology sees culture as behavioral patterns (Rui, 1974). Within this tenet, Sewell (1999) narrows down the scope of culture from all learned behaviors to the behaviors that are related to meaning. He sees culture as a family of concepts, and it covers multiple learned behaviors that are related to meaning. Some definitions use culture to encompass both shared assumptions and shared behaviors. Harrell and Huang (1994) distinguish the definition of *culture* in the anthropology context and the definitions of *Culture* in the humanities context. The former view culture as collectively held systems of meaning or patterns of thought and behavior. These systems and patterns form a context for lives. There is overlap between culture in this sense and the *Culture as Context* family of definition. *Culture* in the humanities context refers to the artistic, literary, and other expressive products of the mind and spirit.

A few observations surface from the definitions. First, while what is learned and shared in a cultural group varies, behavior is the more observable manifestation of culture. Second, viewing

culture as collective phenomena emphasizes one characteristic of culture, which is culture distinguishes members of a cultural group from non-members (Goodenough, 1971; Hofstede, 1994; Kluckhohn, 1944; Knorr-Cetina, 1999; Lee, 2015; Steinwachs, 1999; Tylor, 1958). Third, we can reflect on the units of analysis in the studies about culture. As Kroeber (1917) suggests, researchers should distinguish study of a culture from study of the people who create or accept a culture. This perspective is aligned with the idea of *configuration*. A cultural configuration consists of cultural knowledge and practices that are structured around a set of values and norms (Patterson, 2014). An individual can shift between multiple cultural configurations. That is, multiple cultures may coexist within an individual (Lee, 2015).

Culture as the Human-made Part of Environment

The third family of definition is culture as the human-made part of the environment. Menou (1982) distinguishes two types of culture in this tenet: objective/material and subjective/non-material. The former includes artifacts, such as settlements, housing, language, and characteristics of cultural heritage (Huang, 2017; Rui, 1974) and observable patterns of human activity, such as family structure and norms. The latter refers to signs and meanings that shape people's perception. Some examples are values, stereotypes, classification structures, and specificity of descriptors and concepts (Huang, 2017; Jia & Wei, 2012; Chen & Chen, 2015; Chen, Cheng, & Chen, 2013). Anthropology and archaeology studies tend to emphasize this sense of culture, while cultural studies often see culture as signifying or symbolic systems, as discussed in the *Culture as Context* family of definition above (Williams, 2014). Some definitions in this family do not limit the scope of culture to one of the two types as Menou suggests. For instance, Kluckhohn (1944) defines culture as the human-created part of the environment. Harrell and Huang (1994, 1) describe the humanities definition of culture as "artistic, literary, and other expressive products of the mind and

spirit." Some scholars propose different categorizations of the definitions, uses, or meanings of culture to highlight particular aspects of it. The "human-made" aspect is present in many categorizations. For example, intellectual and artistic works and practices (e.g., music, literature, painting, and film) is one category in William's (2014) categories of usages of culture. Also, Sewell (1999) lists two meanings of culture, and one of which views culture as an abstract category or aspect of social life. Culture in this sense is in contrast to other abstract categories or aspects of social life, such as economy and politics.

Other definitions of Culture

Among the various definitions of culture, there are some that do not fit into one of the three families discussed above. Some scholars view culture through a progressive perspective and treat it as civilization or a near synonym of civilization. With this stance, culture is often described along an axis with "civilized" and "ignorant" at two extremes (Hofstede, 1994; Kluckhohn, 1944; Tylor, 1958). Rui (1974) sees culture as a functional and integral whole. In this sense, culture is a system of components (e.g., objects, attitudes, activities) that serves human needs. Williams (2014, 55) identifies a category of culture as a general process of intellectual, spiritual, and aesthetic development. One other definition is culture as practice. In this sense, culture is a collection of variables or tools that are intended for specific purposes, and it helps us understand the meanings of actions. Culture is a sphere of practical activity that encompasses complexities such as changes and conflicts. (Sewell, 1999).

The families of definition highlight prominent aspects of culture that scholars study and discuss. We can see the complexity of culture from the non-mutual exclusivity of the families of definition,

the “other” category, as well as the categories of definitions that cover more than one family. As Sewell (1999) emphasizes, distinguishing different senses of culture is critical in avoiding confusions and false debates. This echoes the motivation of this study -- to sort out different senses of culture and enhance specificity of discussions of culture in the KO context. To achieve this goal, I will go beyond reviewing and grouping definitions of culture. Since many scholars recognize the complexity of culture and describe specificities of culture instead of defining it, the following section will capture the components, manifestations, and characteristics of culture identified in the literature. Complementing the review of definitions, these specificities can help us understand culture from a descriptive lens.

Components of Culture

The components of culture cover both objective/material and subjective/non-material concepts that constitute culture. According to Kluckhohn (1944), culture includes expectations of behaviors, ready solutions for recurring issues, skills, mental blueprints, as well as organization and relationships between the components of culture. Tylor’s (1958) list of components of culture include knowledge, belief, art, morals, law, custom, and capabilities and habits acquired as a member of society. Goodenough (1971) identifies four components of culture, which are percepts and concepts, propositions and beliefs, value/sentiment systems, and operational procedures. Except for the fourth component, the other three are subjective/internal. This reflects his cognitive anthropology stance. Huang (2006) considers the perspectives about morality, time, knowledge, and space as components of culture. These components influence what a cultural group views as a note-worthy event, and shapes the history of the group.

Patterson (2014) identifies two components of culture. One is knowledge structures. These structures are unevenly shared, dynamically stable, collective made, and reproduced. With these shared structures, people can predict, coordinate, and provide meanings to actions. The second component is a pragmatic structure of practical knowledge on which the shared knowledge structures are grounded. Also, Patterson points out that the way we categorize and perceive the world is fundamental to two elements of cultural knowledge, which are schemata and mental models. Schemata refers to the mental shortcuts that help us draw inferences and relate new concepts to known ones.

In the knowledge organization literature, we identify examples of how knowledge organization can be a component of culture. One example is the NPM-CV project. This project develops a traditional Chinese (Taiwan) translation of AAT (Art & Architecture Thesaurus), an internationally used controlled vocabulary for art, architecture, and material culture. Through this project, researchers observe different classification structures in Western art and Chinese art. For instance, calligraphy script styles like Regular script (*Kaishu.* 楷書), Clerical script (*Lishu*.隸書), and Seal script (*Zhuanshu*.篆書) are unique concepts in Chinese art and there are no mapping concepts in the Western art. Also, the preferred characteristics of division for classifying the same type of artwork may differ between Chinese art and Western art (Chen & Chen, 2015; Chen, Cheng, & Chen, 2013). Similarly, Huang (2017) compares AAT with the *Faceted Thesaurus of Chinese Cultural Heritage* in China. While both standards describe cultural heritage, Huang observes differences in term specificity and classification structure. For example, the two standards classify historic sites differently. Jia and Wei (2012) identify mapping challenges between LCSH and the *Chinese Thesaurus* in China. Many challenges are caused by different knowledge representation

syntax (e.g., pre-coordination and post-coordination) and language (e.g., term specificity). One other example is the Indigenous System of Knowledge (ISK) conceptual model proposed by Littletree et al. (2020). The authors point out the colonial history of knowledge organization. They incorporate seven principles of design that are used by indigenous designers of knowledge organization systems in their conceptual model. In doing so, the model highlights the core of indigenous librarianship: respect, responsibility, and reciprocity. This example shows how the core value of a community can shape the design of a knowledge organization system, and further influence knowledge representation. Through these cases, we see how knowledge organization, including classification structure, conceptual model, concepts, and term specificity, is a component of culture. Viewing knowledge organization as a component of culture echoes the components identified by other scholars, such as Kluckhohn's (1944) mental blueprints, Goodenough's (1971) percepts and concepts, and Patterson's (2014) shared knowledge structures. The way we organize knowledge is a part of culture that shapes our perceptions and behaviors.

Manifestations of Culture

Manifestations of culture are observable representations and artifacts of culture. They may be objective/material or subjective/non-material. Some examples are speech, gestures, tradition (Kluckhohn, 1944), social events (Goodenough, 1971), language, practices, literary and artistic expression (Harrell & Huang, 1994), practices, norms, (Hofstede, 1994). Recognizing the complex nature of culture, many scholars agree with Geertz (1973) that we can only study what is observed and described to study the concept of culture. In order to study culture, scholars tend to identify and examine manifestations of culture, which are not only easy to observe, but also the only thing we can observe (Goodenough 1971; Kluckhohn 1944). These observations, and our interpretations

of them, allow us to study the proxies for culture, and thereby develop and compare definitions, models, and theories.

Kluckhohn (1944) thinks manifestations of culture are overt behaviors and artifacts. The former includes speech, gestures, and activities, and the latter covers tradition, and mental blueprints. Goodenough (1971) sees manifestations of culture as "cultural artifacts," and lists three types of them: material manifestations, overt behaviors, and social events. He claims that cultural artifacts are not limited to material objects, and should be distinguished from culture writ large. Hofstede (1994) lists manifestations of culture along a scale of superficial and sophisticated: symbols, heroes, rituals, and values. Symbols are at the superficial end of the scale, because they can be created and changed rapidly. Heroes are models of behavior by people within a culture. Rituals are activities with symbolic meanings. Values are the terminus of the scale. Values are sophisticated beliefs or abstract ideals that guide people's actions and judgments. Among the four manifestations listed, Hofstede groups the previous three as practices, and links the concept "norms" with values. In his opinion, norms are "standards for values that exist within a group or category of people" (Hofstede 1994, 9). Besides the four manifestations, Hofstede provides another set of manifestations, including education, art, and literature. Harrell and Huang (1994) mention four *aspects* of culture, which are language (linguistic separateness), practices in manner and etiquette, how food and drink are served and consumed, and literary and artistic expressions. While the authors do not label these aspects as manifestations of culture, we can discuss these observable representations of culture with other manifestations identified. We can see some similarities and overlaps between manifestations introduced so far. For instance, both Goodenough, Hofstede, and Harrell and Huang list art(s)/artistic expressions, and Hofstede's symbols may include

Kluckhohn's gestures and Harrell and Huang's literary expressions. Rituals, tradition, practices, mental blueprints, beliefs, norms, and values seem to be closely related, since Hofstede treats values, beliefs, and abstract ideals as synonyms.

As Lee (2015) points out, the distinction between components and manifestations of culture is ambiguous, and it differs between scholars. For instance, language is a prominent concept that scholars frequently mention along with culture. Many authors recognize that culture and language are closely related concepts (Kwasnik & Rubin, 2003). However, authors' perspectives about the relationship between culture and language are often unclear. It is not always clear whether language is considered a component or aspect of culture (Taheri et al., 2014), or whether language is considered a manifestation of culture that highlights observable examples of cultural influences in knowledge organization. For instance, many studies focus on language and translation issues when discussing cultural influences in cataloging practice (Cheng, 2018; DuBose, 2019; Huang, 2017). We can treat language as a component of the "human-made part of human environment" (Menou, 1982). We can also see language as *speech* (Kluckhohn, 1944), *symbols* (Hofstede, 1994), or *literary expression* (Harrell & Huang, 1994) and treat it as a manifestation of culture. Besides components and manifestations of culture, some scholars describe the traits or characteristics of culture. It is challenging to map terminologies and concepts between different models, but the purpose of this literature review is to present the models collectively and as systematically and organized as possible.

Characteristics of Culture

This section highlights the traits of culture that surface from the definitions, components, and manifestations of culture reviewed.

(1) Culture can be used as a spatial metaphor such as national culture (López-Huertas, 2008; 2013; Hofstede, 1994; Steinwachs, 1999; Huang, 2017), but with recognition of some limitations and compromises (Moulaison, 2010; Steinwachs, 1999; Olson, 2000; Hsueh & Wu, 2011). For example, Moulaison (2010) examines Dewey Decimal Classification (DDC) and the culturally adapted Ibn Rushd (the Muslim West) Thesaurus (IRT). DDC groups modern locations by continent and country, while the IRT is localized with emphasis on history and time, and groups locations by historic areas of conquer and the discovery of the Muslim West. The differences between terms of geographic designation and terms of cultural designation highlight how geographic and national boundaries are closely related but different from cultural boundaries. Hsueh and Wu (2011) also points out that the boundaries of a culture do not necessarily fit the boundaries of a country, a region, or an ethnic group.

(2) Culture is a sphere where multiple axes of tension intersect. Some axes of tension are continuums, and some are directional. There are axes of globalization and localization, tradition and modernization, cosmopolitan and local, native and foreign, superficial and sophisticated, simple and complex (Harrell & Huang, 1994; Rui, 1974; Hofstede, 1994). A culture is situated somewhere along each axe of tension, and continuously finding a balance between extremes.

(3) Culture is interactional. Culture is often intertwined with other structural forces. Culture has causal influences on human actions and other concepts, such as politics, ethics, and identity. The causal force, however, is not deterministic (Harrell & Huang, 1994; Hsueh & Wu, 2011; Huang, 2006; Smiraglia & Lee, 2012; Olson, 2000; Patterson, 2014; Rui, 1974; Wen, 1974). For instance, scholars point out that culture shapes history and identity (Huang, 2006; Hsueh & Wu, 2011). Harrell and Huang (1994) use Taiwan as an example and show how government imposed cultural controls influenced the identity of Taiwan. Wen (1974) discusses the perspectives of the *economy and technology school*. Scholars in this school of thought (e.g., Karl Marx, Thorstein Veblen, and William Ogburn) see economy and technology as the motivations for socio-cultural changes. Smiraglia and Lee (2012) analyzed three super works and show that the *authorship principle* has been embedded in the Western cataloging rules. They argue that this principle, the emphasis of attributing a discourse to its author(s), is a form of cultural classification that shapes bibliography and scholarship. These examples present how culture may interact with structural forces.

(4) Culture is an influential causal force, but it is often not the only and deterministic one. As noted at the beginning of this literature review, culture as a meta-concept influences many other concepts. We may identify different forces of cultural influences that are manifested in various forms in many phenomena. For example, a resource description could be shaped by multiple forces of culture. There are culture(s) embedded in the resource, in forms like language and resource type. There are culture(s) expressed through knowledge organization standards and different levels of best practices (e.g., best practices within an institution and best practices of a consortium). The information professional who creates the resource description could also add cultural influences to their decisions and deliverables (Lee, 2017b, 2019). Oftentimes, culture is not the only causal

force, and it does not determine human behaviors or social structures. This characteristic makes it challenging to identify manifestations of culture and study cultural influences.

(5) Culture is constituted, multi-layered, and multidimensional. There are different components of culture (Jepperson & Swidler, 1994; Sewell, 1999; Patterson, 2014). This characteristic matches with the *Components of Culture* section. Jepperson and Swidler (1994) view culture as a multi-layered and multidimensional concept that covers a variety of components, including values, norms, convention, custom, and tradition. These components are layered and interrelated. Some components are more fundamental or constitutional while some are more expressive, reflexive, and discursive. Similarly, Patterson (2014) identifies three layers of cultural knowledge. The most fundamental layer is evaluative cultural knowledge, which includes value and norm. The next layer is procedural cultural knowledge, which includes practices, configurations, and organizational culture. It is more fundamental to the third layer -- declarative cultural knowledge, which includes external context. The components of different layers of culture mutually influence each other. This re-emphasizes the interrelatedness described by Jepperson and Swidler (1994). Recognizing the interrelatedness between components of culture in different layers, scholars may observe the manifestations of culture in the declarative and procedural cultural knowledge to inform the fundamental evaluative cultural knowledge.

(6) Culture is dynamic. Elmborg (2011) discusses how the migration of people contributes to the instability of culture. Patterson (2014) describes the shared knowledge structures of a culture as dynamically stable. Culture remains dynamic to adapt to the environment and serve pragmatic purposes.

(7) Culture is collective. Patterson (2014) describes cultural knowledge as meaningful information that is both "shared and public." That is, cultural knowledge is embedded in the interactions between the members of a culture (e.g., indirect speech and collective behaviors), or members of a culture can assume that other members know the cultural knowledge as well. Members of the same culture not only share meaning or understanding, but also take up the meaning collectively as a group. This characteristic contributes to its providing predictability, regularity (e.g., routine), and meaning in human actions and interactions (Jepperson & Swidler, 1994; Kluckhohn, 1944; Patterson, 2014). This also corresponds to the *culture as collective phenomena* family of definition.

(8) Different cultures coexist. The set of norms, rules, ways of knowing, and values of a culture may reinforce or compete with other cultures. An individual may experience conflicting cultures when the value in one culture (e.g., the culture of an institution, the culture of a profession) conflicts with other cultures (e.g., the culture of a local social unit, personal beliefs). Also, different ways of knowing may serve different purposes in practice. Hence, to analyze a manifestation of culture, we must identify the cultures at play and the interactions between different cultures (Knorr-Cetina, 1999).

Culture in the Knowledge Organization Context

Given the complex and intertwined concepts of culture, its components, and its manifestations, it would be helpful to follow the proposals of previous research (Geertz 1973; Goodenough 1971; Kluckhohn 1944), and focus on manifestations of culture as the objects of study. In this case, I examine how culture manifests in the development and implementation of knowledge organization

standards. I analyze the editor's design rationales for three knowledge organization standards and catalogers' applications of multiple knowledge organization standards.

To put this study in context, my research focuses on culture in the knowledge organization context. It falls within a topic of contemporary research: ethical and inclusive data representation. To provide data representations that are ethical and inclusive to diverse perspectives (e.g., race, gender, and ethnicity), information professionals, including the GLAMs (galleries, libraries, archives, and museums) community, increasingly emphasize diversity, equity, and inclusion in research and in practice. For instance, Caswell and Cifor (2016) propose using a feminist ethics approach in archives. This is a more inclusive model that emphasizes mutual affective responsibility and empathy between archivists and stakeholders, such as record creators, subjects, users, and communities, to support social justice. Haberstock (2020) advocates for applying decolonizing methodologies in archival descriptions to better represent multicultural, community, and participatory archives. Robinson (2017) uses the *Encounters* exhibition as an example to highlight the importance of engagement and collaboration with the indigenous community to realize cultural democracy under the existing museum frameworks, such as the collecting practices and representation conventions. Previous knowledge organization studies contribute to this topic as well. Bednareks (2007), Doyle et al., (2015) and Matsuda (2017) present examples of localizing knowledge organization systems to serve indigenous people in New Zealand, Canada, and Hawaii, respectively. Thompson (2016) discusses the limitations of the internationally used MARC (Machine-Readable Cataloging) structure, and how those limitations lead to problematic descriptions in name authority records for people who self-identify as trans. Smiraglia (2014) talks about cultural frames of knowledge. He links this topic to domain analysis, and adds perception to

Hjørland's four classes of epistemic approaches to domain analysis. He points out that culture shapes perception, and perception further shapes how people comprehend the world. The notion of how culture influences perception echoes Olson's (2000) application of the Third Space model. Olson applies Homi Bhabha's Third Space model to the context of libraries. The Third Space model emphasizes how meaning construction is influenced by both content and context. Olson regards librarians and subject descriptions, like the Library of Congress Subject Heading (LCSH), as third space. It is a space between information and users in which meaning is constructed. In this sense, a classification scheme is also a third space. It frames the context of subject representation, which influences how people perceive a subject or the whole body of knowledge. Through the process of meaning construction, subject representation and the classification scheme present a certain worldview, which conforms to their embedded culture. On one hand, we recognize that cultural influences are embedded in knowledge organization. On the other hand, as Olson points out, knowledge organization can also influence cultures by presenting and reinforcing one worldview while excluding or misrepresenting others. Acknowledging the mutual influences between culture and knowledge organization, scholars raise ethical concerns and call for knowledge organization that is inclusive to diverse perspectives (Adler, 2017; Duarte & Belarde-Lewis, 2015; Littletree et al., 2020).

A Working Definition of Culture in the Knowledge Organization Context

Building on the previous knowledge organization studies and the families of definitions, components, manifestations, and characteristics of culture, we are able to reflect on a more complete picture of culture by integrating aspects presented by different perspectives. We can also identify core ideas of culture by highlighting concepts mentioned repeatedly by different scholars. For the purpose of studying the role of culture in knowledge organization and operationalizing

cultural warrant, I propose a working definition of culture in the knowledge organization context. *For our purposes, culture is a cognitive framework constructed by a community. The framework influences how people within the community perceive the world. For us, culture is learned, dynamic, and co-existing.* The younger generation of members of a culture 1) learns to participate in culture through family and school, and learns by conforming to social norms. The learning and conforming process is critical in making culture collective phenomena that are shared among a group of people (Goodenough, 1971; Hofstede, 1994; Hsueh & Wu, 2011; Kluckohn, 1944; Lee, 2015; Sewell, 1999; Steinwachs, 1999; Tylor, 1958). Culture is also 2) dynamic. As shown in the literature review, both manifestations and components of culture include concepts that evolve over time, such as language, norms, and beliefs (Elmborg, 2011; Harrell & Huang, 1994; Patterson, 2014; Tylor, 1958). With dynamic manifestations and components, we can infer that culture, and people's perceptions of a culture change as well. As a result, a dominant culture can be replaced by another culture, which leads to the third characteristic. 3) Multiple cultures coexist. This is supported by Olson (1999), Knorr-Cetina (1999), Ohly (2013), and Patterson (2014). Ohly (2013) observes that subcultures coexist with the mainstream culture at the societal level. Olson focuses on bibliographic classifications and points out that a classification scheme is efficient in representing the mainstream in its originating culture, but it may not represent other cultures and marginalized concepts. Multiple cultures even coexist within a person. Since a person often belongs to multiple groups (e.g., ethnicity, gender, religion), it is very likely that a person possesses multiple cognitive frameworks. This echoes Hofstede's perspective. Hofstede names the different cultures within a person as *levels* of culture, he assumes that "people unavoidably carry several layers of mental programming within themselves, corresponding to different levels of culture" (Hofstede 1994, 10), such as national level and social class level. Different levels of culture may

conflict with one another. Similarly, Patterson (2014) describes how individuals have access to multiple *cultural configurations*. A configuration is the cultural knowledge and practices shared by the members of a cultural group who have a common set of interests, goals, or needs. Depending on the context, individuals may activate and shift between different cultural configurations.

I use this working definition of culture in this study, and I will continue to test this definition in my work about culture in knowledge organization.

Cultural Warrant: consciously accounting for culture in classificatory decisions

After reviewing literature and proposing a working definition of culture in the knowledge organization context, I further scope the focus of this study on *cultural warrant*, an approach to consciously account for culture in knowledge organization. Recognizing that variant cultural forces (e.g., levels or configurations of culture) may shape the knowledge organization process, the purpose of this study is to capture evidence of cultural warrant and operationalize this concept. Through collecting and analyzing prominent examples of cultural warrant, we can advance our understanding of how culture manifests in the development and implementation of knowledge organization standards. This will not only make us more aware of the embedded cultural influences in knowledge organization, but will also set a better foundation for inclusive knowledge organization.

Before delving into cultural warrant, we need to understand the concept of *warrant* in the knowledge organization context. Warrant is the source and rationalization to justify classificatory decisions, such as term choices for classification and indexing, the inclusion and exclusion of concepts in a classification, citation order, and the level of specificity for concepts and classes

(Barité, 2019; Beghtol, 1986; Feinberg, 2010; Tennis, 2005). Previous studies identify more than 20 warrants, including literary warrant (Hulme, 1911), cultural warrant (Lee, 1976), user warrant (Lancaster, 1977), ethical warrant (Beghtol, 2002a), and structural warrant (Svenonius, 2003). The scope of influence of warrant can go beyond a particular classification or controlled vocabulary. Warrant influences the design, interpretation, application, evaluation, and revision of knowledge organization systems that apply a classification or controlled vocabulary (Barité, 2019). The prioritization of warrants may shift over time and at different stages (e.g., design and application). The shifting may result in conflicts between different warrants.

Among the many warrants, Beghtol (1986) uses *semantic warrants* to refer to the semantic aspect of bibliographic classifications that are used to justify the utility of classification systems. Beghtol identifies four types of semantic warrants, which are literary warrant, scientific/philosophical warrant, educational warrant, and cultural warrant. *Cultural warrant* is first introduced by Lee (1976) and later discussed in depth by Beghtol (1986). It means information professionals use culture to justify classificatory decisions. Adopting cultural warrant not only acknowledges cultural influences, but also consciously accounts for culture in knowledge organization. Along the same vein, Beghtol (2002a) proposes *cultural hospitality*, a concept that is closely related to cultural warrant. Cultural hospitality refers to the extent of a knowledge organization process to include and represent diverse cultural perspectives. A culturally hospitable knowledge organization system would allow users to make cultural and personal choices by incorporating different cultural concepts and establishing both semantic and syntactic relationships between the concepts. Specifically, Beghtol suggests two approaches to increase the cultural hospitality of a knowledge organization system. One is the authority file approach, which maps and connects identical or similar concepts across languages or cultures, but this requires selecting one authorized

form over others. The other approach is the individual choice approach, which allows individual users to choose a worldview and an access mechanism at different times to serve different purposes. We can view the attempts to increase cultural hospitality as one way of realizing cultural warrant. The efforts to include diverse cultural perspectives to a knowledge organization system is an example of consciously accounting for culture in the knowledge organization process. We can also view cultural hospitality as a concept that connects cultural warrant to ethical warrant. By increasing cultural hospitality, users from different cultures would be able to interact with the knowledge organization system through the cultural perspectives they select. The system would be able to serve a more diverse group of users and provide more equitable and ethical access to knowledge.

Besides cultural hospitality, the approaches of adopting cultural warrant, however, may take many forms. Barité describes the adoption of cultural warrant as invoking "the language of communities with their own cultural or local identity" as the source of authority to collect terms (Barité, 2019, p.650). Besides term collection and selection for knowledge organization standards, cultural warrant could manifest in other aspects of the classificatory process as well. This study aims to identify and analyze the examples of cultural warrant in knowledge organization standards and practices to operationalize this concept. To operationalize cultural warrant, we face the ambiguity of culture, as presented in the literature review, and the complexity of cultural warrant.

Cultural warrant is complex in several ways. First, it can be challenging to identify the warrants of a knowledge organization standard or practice in the first place, because warrants are not always explicitly stated and documented. Without documentation, we can only infer the warrants taken into account, with varying levels of confidence. Also, while we may be able to examine cases to capture the context and identify warrants, the warrants accounted for in the design phase of

knowledge organization standards may not be identical with the warrants observed in practice. Furthermore, cultural warrant may intertwine and conflict with other warrants. For instance, cultural warrant can conflict with user warrant when the resource content language differs from the preferred language of an institution. Observations of cataloging practices show that the prioritization of warrants may change in different cases. It is possible to acknowledge cultural warrant but prioritize other warrants over it (Lee, 2017b). It requires in-depth analysis of the entire knowledge organization process to unveil the influences of different warrants. Merely observing the results of knowledge organization (e.g., resource descriptions) risks omitting or over-simplifying the role of warrants in the knowledge organization process, especially in complex cases like workarounds and disagreements (Lee, 2019). One other factor that contributes to the complexity of cultural warrant is the vague scope of culture in cultural warrant: what/whose culture(s) are warranted? Some may consider the culture of the users as the warranted culture. For example, Gomes and Frota (2019) state that "cultural warrant is, therefore, the means of inserting users' values into a KOS [knowledge organization system], which will afterwards be accessed by the users themselves." However, using *the users* to explain the warranted culture does not clarify the ambiguity. Recognizing that multiple cultures coexist within an individual, we can also recognize the illusion of a harmonious set of users' values. Further, while general users and information professionals who interact with a knowledge organization system are critical stakeholders, they are not the only sources of cultural influences that may be warranted. Acknowledging these complexities, previous studies show a need for operationalizing cultural warrant. For instance, in the discussion about relationships between warrants, Barité (2018, 2019) considers ethical warrant related to cultural warrant. Indigenous warrant and genre warrant are two types of cultural warrant, and gender warrant and policy warrant may be types of cultural warrant

as well. The criteria for deciding whether a warrant is a type of cultural warrant remain unclear. Operationalizing cultural warrant can provide a better idea of this concept, and potentially contribute to discussions about the relationships between cultural warrant and other warrants.

An Expansion of Cultural Warrant: from Classification to the Knowledge Organization Process

Based on the definition of *warrant*, the scope of cultural warrant is on classificatory decisions, which focus on subject description and representation. While it is indeed helpful to have a concept emphasizing cultural influences in classificatory decisions, and the specificity of the scope contributes to more focused discussions, I would like to argue for expanding the scope of cultural warrant to the entire knowledge organization process. The knowledge organization process includes several components, such as resources, agents, knowledge organization actions, standards, practices, and principles, descriptions, and knowledge organization influences. I incorporated these components into my codebook. Please see the *Codebook* section in the *Methodology* chapter for the definitions of these components.

Through previous studies and my ethnographic observations of cataloging practices, it is evident that culture influences all components of the knowledge organization process (Barite, 2019; Lee, 2017b, 2019; Smiraglia & Lee, 2012; Thompson, 2016). Classification is only one of the many forms of knowledge organization actions and a part of resource description. Classification schemes and controlled vocabularies are two types of knowledge organization standards. In addition, the components in the knowledge organization process are closely related. While we may prefer to distinguish classification from other elements of resource description (e.g., adding physical

descriptions and administrative metadata for resources) in conceptual discussions, the distinction is not always clearly made in practice. At the beginning of my ethnographic fieldwork, I entered the field to study cultural warrant with the original, narrower sense. However, the cataloger I worked with suggested that I expand the scope of observation to cover the entire knowledge organization process: "If you only want to focus on cultural influences in classification and subject description, there might not be as many exciting things to observe. After all, classifying an English resource and a Chinese resource are not that different in most cases." Through expanding the scope of cultural warrant, we can compare and apply what we have learned about cultural warrant from classification to other knowledge organization actions, and vice versa. It allows us to get a more comprehensive view of cultural influences in resource description. For instance, the cultural influences that are embedded in a resource type (e.g., stone rubbings and rare books) may affect its classification. By expanding our view from classification to the entire knowledge organization process, including *resources*, we could get a better understanding of the context, such as tracing the sources of cultural influences in classification. One other rationale for expanding the scope of cultural warrant lies in the motivation of applying warrants. We care about warrants because we require justifications for classificatory decisions, which lead to *knowledge organization consequences*. Classification is one of the critical components of the knowledge organization process that contributes to knowledge organization consequences, such as ethical concerns and the global-local tensions. However, it is not the only influential factor, and there is no guarantee that it is the most influential factor, either. Through carefully expanding the application of warrants, that is, being constantly aware of the original/narrower scope of warrant in previous studies, we can observe the relationships between warrants in different components of the knowledge organization process, and better explain particular knowledge organization consequences.

Furthermore, there have been other expanded uses of *warrant*. For instance, archival studies, as one of the major fields that contributes to resource descriptions, uses literary warrant in a different sense. MacNeil (2004) uses literary warrant as a method of inquiry that justifies the inclusion of a concept in the diplomatic model. This is an example of carefully expanding the use of warrant while keeping the gist of it. If we follow this path, we could see connections between warrants and other forms of knowledge organization actions or other components of the knowledge organization process. For instance, in Resource Description and Access (RDA), an international cataloging guideline, we can identify similarities between warrants (e.g., user warrant) and its principles and objectives. Applying warrants in an expanded sense could help us investigate how warrants influence the design, interpretation, application, evaluation, and revision of knowledge organization systems. It allows us to observe the shifts of prioritization of warrants and the relationships between different warrants throughout the knowledge organization process. In this study, I will use cases in both classification and resource description in general to operationalize cultural warrant.

3. Methodology

Epistemological Stance and Methods

Recognizing the reflexivity in my study -- the object of study and I mutually influence each other (Alvesson & Sköldberg, 2000) -- I will present my epistemological stance, and discuss how the stance shapes the research questions and influences my choice of methods: case studies and ethnography. Following this, I will explain my coding process and introduce the codes with a complete codebook. These codes are applied to analyze the editorial documents of three knowledge organization standards and the fieldnotes for cultural influences in cataloging practices.

Epistemological Stance: Social Constructionism and Pragmatism

My epistemological stance is a combination of social constructionism and pragmatism. The two traditions complement each other and form the foundation of this study. From the social constructionist point of view, knowledge and people's perspective of reality are socially and culturally constructed, rather than discovered. Groups of individuals communicate meanings and perspectives of realities through different languages. No one view is privileged over others. This tradition emphasizes language use, such as discourses, conversations, and vocabularies, and considers language use as dynamic and contextual. Instead of neutrally reflecting a reality, language can create, reproduce, negotiate, and transform meanings in communication and description. With a social constructionist stance, studies often focus on the ways communities (e.g., social groups, organizations, disciplines) construct their realities and the development of shared views (e.g., culture, tradition, values, rules). One critique of social constructionism is relativism. This critique is toward the claim that no one reality or perspective is privileged over others. This

claim fails to explain the situations when some perspectives are prioritized over others to address ethical concerns or serve particular purposes. (Kelder, Marshall & Perry, 2005; Talja, Tuominen & Savolainen, 2005).

Similar to social constructionism, the pragmatist point of view also sees reality as contextual, social, and cultural. There is a wide variety of perspectives in pragmatism. The three classical pragmatist views by Charles Sanders Pierce, William James, and John Dewey, share the view that people's beliefs about the world are based on experiences. When beliefs are challenged, people would try to resolve the doubt to their beliefs (i.e., inquiry) and generate new beliefs. The three perspectives, however, have different opinions about how people generate beliefs. Pierce's view is scientifically oriented. The assumption is that people's inquiry would ultimately reach a consensus that is based on scientific opinion and external reality. James's view suggests that people would generate beliefs that are comparable to their other beliefs, compliant with their experiences, and practically beneficial for their purposes. Since individuals' purposes vary, there are diverse truths and realities. Dewey's view sees the approach to generate beliefs as a social action that is tied to communities, such as epistemic communities and domains in the knowledge organization context. The three perspectives highlight the scientific approach, subjective purposes, and the social nature of inquiry, respectively. In the knowledge organization studies, there are traces of all three perspectives (Dousa, 2010). Besides the variances, perspectives in the pragmatist tradition share some common characteristics, such as being socially embedded and pluralist (Jacob, 2000). This tradition focuses on practice. Instead of pursuing the timeless truth, the pragmatist view searches for useful perspectives for stakeholders. In this tradition, the useful perspective may change over time (Kelder, Marshall & Perry, 2005).

The combination of social constructionism and pragmatism highlights the contextual nature of perspectives and realities. In addition, the pragmatist view complements the social constructionist view by addressing the critique of relativism. As mentioned, the social constructionist view treats different perspectives equally, while particular perspectives are often prioritized over others in the real world. The pragmatist view can address this issue by providing criteria for the prioritization of perspectives -- the relevance and usefulness for stakeholders (Kelder, Marshall & Perry, 2005).

The stance of social constructionism and pragmatism shapes this study in the following ways:

Context: Knowledge organization standards selection and ethnography

Both social constructionism and pragmatism emphasize the contextual nature of knowledge and perspectives of realities. This emphasis shapes RQ2, in which I analyze editorial documents of knowledge organization standards to identify manifestations of culture. Knowledge organization standards are contextual. They not only represent contextual perspectives, but also reflect the social, cultural, and temporal contexts of their creation. To collect rich contextual information and observe how contexts shape the standards, I deliberately select knowledge organization standards that are established in different times, for different regions, and in different languages. The emphasis of context also shapes RQ3, in which I identify manifestations of culture in cataloging practices through an ethnographic approach. The choice of ethnography is aligned with the emphasis of contexts. Ethnographic fieldwork requires prolonged engagement. It allows me to capture the contexts of cataloging scenarios that span across a long period of time. For instance, I was able to observe the proposal of a Library of Congress subject heading that took one year for revisions and approval. Through participatory observations and informal interviews, I am able to interact with

librarians and clarify the rationales of their decisions. The ethnographic approach is powerful in capturing contextual information that may not be accessible through other methods (Lee, 2018, 2019).

Diverse perspectives and realities: Exploration of cultural warrant

The combination of the social constructionist view and the pragmatist view recognizes diverse perspectives and realities, and prioritizes the perspective that is relevant and useful to particular stakeholders. In the knowledge organization context, this stance aligns with the pluralistic understanding and beyond camp of thoughts (Hjørland & Albrechtsen, 1995; Mai, 2004, 2009). This camp of thoughts is a response against the universalist view, which pursues one ideal and universal classification. Scholars with the pluralistic understanding view acknowledge the contextual nature of classifications, and consider worldviews and interpretations of knowledge as context dependent. A classification may favor a particular group in a particular context. Beyond the pluralistic understanding view, some scholars propose treating classification as arguments for interpretations (Feinberg, 2007). My exploration of cultural warrant is along this line of thought. The assumption for RQ2 and RQ3 is that knowledge organization standards and practices may represent diverse cultures. The culture represented in a knowledge organization standard or practice may differ from the cultures of the user communities. Ethical issues may arise when there are differences between the cultures of local user communities and the culture that has produced a certain knowledge organization standard. This assumption motivates the exploration of the manifestations of culture in knowledge organization. Further, the purpose of RQ2 and RQ3 is to identify and observe prominent manifestations of culture in knowledge organization standards and practices, rather than comparing different standards and practices to determine the best one.

Language: Knowledge organization standards selection, and field selection

The social constructionist view emphasizes the dynamic and contextual nature of language use. The emphasis not only ties to resource description, but also influences knowledge organization standards selection and field selection in this study. Resource descriptions, including cataloging records, classification, and metadata are presented by language, which is cultural, social, and value embedded. For instance, in different languages, the specificity of descriptors for the same concepts may differ (Lakoff, 1987). In addition, resource descriptions often require specific language use. The application of controlled vocabulary is an example. Despite some efforts to create "objective" representations, such as the transcription principle in cataloging tradition, interpretations or translations are inevitable in knowledge organization and resource description. Similar to translators, information professionals can apply different strategies and select different focuses to analyze a resource (Simon, 1996; Venuti, 2008; Takayuki, 1995). Depending on the strategy and focus chosen, as well as the guidelines, rules, and best practices followed by a particular community, the structure and presentation of a resource description in one community may differ from another community. For example, to describe a set of Chinese rare books, a library may choose to use the Resource Description and Access (RDA) guidelines while another library prefers to use the Cataloging Guidelines for Creating Chinese Rare Book Records in Machine-Readable Form (CGCRB). The choice of standard would shape resource descriptions. Furthermore, language use in resource descriptions may lead to cultural and ethical issues, such as loss of meaning, loss of context, and misinterpretation. The lack of accurate, specific, and authorized descriptors for non-mainstream cultures is one reason that may trigger these issues (Lee, 2019). Recognizing the influences of language use, I deliberately select knowledge organization standards in different languages and times for RQ2. Further, the field for RQ3 is intentionally selected to

observe variant language uses. It allows me to observe how catalogers use U.S. and international standards to describe resources in English and Asian languages. In this field, the resource languages (e.g., Chinese, Japanese, Korean) are often different from the language of descriptions (i.e., English).

Practice: The focus of RQ3

Among the possible approaches to study manifestations of culture in knowledge organization, I chose to take a pragmatist view. The pragmatist view focuses on practice, such as the relevant and useful approaches for a particular user community. Through a pragmatist view, I design RQ3 to focus on cataloging practices. The observations focus on the practices of an academic library that has rich Asian collections, while also cover cataloging practices in other communities (e.g., Program for Cooperative Cataloging (PCC) and the China Academic Library and Information System (CALIS)). Through ethnographic fieldwork, RQ3 captures rich descriptions of actual uses of knowledge organization standards, such as workarounds, disagreements, and compromises (Lee, 2019). The results can complement RQ2, which explores the intended purpose, assumptions, and embedded values of knowledge organization standards. The comparison between RQ2 and RQ3 highlights the focus on practice by presenting differences between intended use and actual use of knowledge organization standards.

Communities, Stakeholders, and Cultural groups

The social constructionist view focuses on how communities construct and share their realities. The pragmatist view assesses usefulness and relevance by the needs of stakeholders. Both traditions account for the groups of individuals that are influenced by the realities they constructed.

Similarly, this study explores manifestations of culture, in the context of the cultural groups that construct the cultures.

The pragmatist view is aligned with the assumption of cultural warrant. As Beghtol (2002b, p.45) points out, cultural warrant is based on the assumption that every classification is based on certain culture, and that "a knowledge organization system is more likely to be useful and appropriate for those who are members of a culture and that it is less likely to be useful and appropriate for those who belong to some different culture, at whatever level of society that culture or domain may reside." Further, in both RQ2 and RQ3, I will discuss the identification and prioritization of warrants, especially cultural warrant, in knowledge organization standards and practices. The prioritization of warrants ties closely to the needs and goals of local communities.

Methods: Case Studies and Ethnography

For *RQ2: How is culture manifested in knowledge organization standards?*, I will present case studies of the editorial documents of three knowledge organization standards. The goal is to surface the warrants and prioritization of warrants in the *development* of those standards. I selected the knowledge organization standards based on the following criteria: (1) type of resources described, (2) language, (3) publication time, (4) type of standard, (5) position in the global-local tension, and (6) connections with RQ3 (i.e., is this standard applied in the field for RQ3?). The three standards are the New Classification Scheme for Chinese Libraries (CCL), Nippon Decimal Classification (NDC), and Resource Description and Access (RDA). See Table 1.

CCL (the New Classification Scheme for Chinese Libraries) is a decimal classification. The current edition is widely used in public libraries in Taiwan. The first edition was published in 1929

in Nanjing, China. This study analyzes the first edition of CCL because of the particular context of its development. At that time, the editor Liu (1929) saw the urgent need to establish a modern Chinese classification to accommodate new knowledge and promote standardization. Liu provided the rationale to adapt, instead of adopting, the established Dewey Decimal Classification (DDC). Through understanding the context and rationales, we can further examine the warrants embedded in the design of this scheme.

NDC (Nippon Decimal Classification) is a decimal classification used in many public libraries in Japan. The first edition was published in 1929. At that time, the editor Mori observed the problems of lacking a standardized Japanese classification scheme and the lack of index in classifications. Besides the need for standardization, Mori pointed out the issues of treating Japanese and non-Japanese/Western books differently in classifications, and foresaw potential issues of fully adopting an established foreign classification scheme like DDC. In the first edition, Mori provided rationales and warrants of developing NDC. The cases of CCL and NDC serve as a great between-case comparison. While both cases have similar temporal contexts and address the global-local tension from the position of local communities, the purposes, concerns, and challenges of developing the two schemes differ.

RDA (Resource Description and Access) is an international cataloging guideline that succeeds the Anglo-American Cataloguing Rules Second Edition (AACR2). Widely applied in the library community, this standard describes a wide range of resource types. Unlike the other two standards, RDA is a contemporary cataloging standard which focuses on both subject and physical descriptions. Further, with continual efforts of IFLA (International Federation of Library

Associations and Institutions) and RSC (the RDA Steering Committee), the standard aims to go beyond the Anglo-American context. By analyzing the editorial documentations of RDA, we can get the perspective of developing a standard from the position of the globalization side of the global-local tension (Dobreski, 2019). We can observe how the editors attempt to improve cultural hospitality of the standard. In this sense, RDA serves as a good comparison with the two other standards, which reflects the perspective of developing localized standards. RDA is not a classification scheme for between-case comparison with CCL and NDC. However, the selection of RDA complements the other two standards as a case of a different type of knowledge organization standard. Another reason for selecting RDA is its connection with RQ3. For RQ3, I observe catalogers apply several knowledge organization standards in their work. RDA is one of the standards applied in the observed practice. By analyzing both the editorial comments (RQ2) and the applications (RQ3) of RDA, I can examine the similarities and differences between the intended use and actual use of a knowledge organization standard, and how culture relates to the observations.

KO standards	**CCL (1st edition)**	**NDC (1st edition)**	**RDA**
Types of resources described	General	General	General
Language	Chinese	Japanese	English
Publication time	1929	1929	current
Type of standard	Classification scheme	Classification scheme	Cataloging guidelines
GLOCAL tension	Localized standard	Localized standard	Global standard
Connections with RQ3	No	No	Yes

Table 1. Selection criteria for three knowledge organization standards: CCL, NDC, and RDA.

For *RQ3: How is culture manifested in cataloging practices?*, I took an ethnographic approach. I analyzed 43 observation sessions with fieldnotes through qualitative coding. The fieldnotes were generated from an ongoing ethnographic study on *culture and data practices*. After receiving approval from the Institutional Review Board, I started exploring manifestations of culture in cataloging practices and data practices in general in September 2015. I have been shadowing a cataloger Q (pseudonym) at an academic library once a week, and at least two hours for every observation session. In the field, I conduct participatory observations and informal interviews and take fieldnotes. Occasionally, there are opportunities to observe interactions between Q and other librarians. Q is experienced in applying international and U.S. standards to catalog materials in variant formats and languages. As a native Chinese speaker, Q not only catalogs English and Chinese materials, but also collaborates with other librarians to describe materials in Japanese, Korean, and other languages. The fieldwork focuses mainly on Q's work and her interactions with other librarians, both within and outside the institution. This study analyzes the initial 43 observations that happened between October, 2015 and August, 2016. The focus of these 43 observations is distinguished from its following observations due to personnel change. Z (pseudonym) is a scholar and librarian who frequently interacted with Q during the observation period, so I set up one observation session with Z and got consent from both Q and Z to use my observations of their cataloging scenarios and resource descriptions for educational and research purposes. Through prolonged engagement and thick description, the ethnographic approach allows me to capture rich cataloging practices by observing cataloging scenarios that span across a long period of time, as well as drawing out themes from multiple scenarios.

I selected ethnography to study the cultural manifestations in cataloging practices because ethnography is "the art and science of describing a group or culture." (Fetterman, 1989). The strengths of ethnography include describing a group or culture through observing events and actions in natural contexts. Through prolonged engagement with and thick descriptions of the everyday life and practices of the studied group, researchers can observe and document the meanings of behaviors and phenomena, identify patterns across cases, and address cultural issues (Alvesson & Sköldberg, 2000). There are, however, limitations to this method. In ethnographic studies, researchers make many decisions that inevitably shape the study. Researchers shape an ethnographic study through field selection, deciding what to include and exclude in fieldnotes, and the interpretation and presentation of the themes surfaced from fieldnotes. Researchers' epistemological stance and subjectivity are embedded in ethnographic studies. To address the limitations, I discussed reflexivity and present my epistemological stance. Also, I connect findings from the fieldwork to relevant previous studies. While a finding in an ethnographic study can be based on a single case, its implications to conceptual arguments may contribute to a larger body of literature. Besides presenting ethnographic observations, I identify and build these connections.

Coding

To answer RQ2 and RQ3, I analyzed editorial documents of three knowledge organization standards and 43 fieldnotes through qualitative coding. For the first edition of the CCL (the New Classification Scheme for Chinese Libraries), I translated and coded (1) the *Preface* written by Xiao-Yuan Lee, (2) the *Preface* written by the editor, Kwoh-Chuin Liu, and (3) the *Introduction* written by the editor. For the first edition of the NDC (Nippon Decimal Classification), I translated and coded (1) the *Foreword* written by Mamiya Fujio, (2) the *Introductory Remark* by the editor,

Mori Kiyoshi, (3) the *Preface* by Mori, and (4) the *Introduction* to the scheme by Mori. For RDA (Resource Description and Access), I coded relevant documents that are available on the RDA website: (1 & 2) the 2004 and 2009 editions of its *Objectives and Principles*, (3) Strategic Plan 2005-2009, (4) Strategic Plan 2020-2022, (5 & 6) the 2009 and 2016 editions of IFLA's *Statement of International Cataloguing Principles*, and (7) RDA's *Purpose Statement*.

There are 37 codes in 3 groups: *conceptual tools*, *knowledge organization process*, and *warrants*. Through literature review, I identified 8 concepts that are relevant to culture in the knowledge organization context, out of which 6 are represented in the *conceptual tools* group and 2 are in the *knowledge organization process* group. The next section will provide justifications for including each concept as a code. These concepts were deductively added to the codebook, and they serve as pointers to help identify manifestations of culture in the knowledge organization standards and ethnographic observations. Through applying these codes, I revised scope notes inductively to highlight specific components of the concepts that are especially relevant to cultural influences in knowledge organization. For example, *activity theory* is a concept identified from the literature. It was added to the codebook. There are multiple components in this concept, including subject, object, and actions. After applying this code, I analyzed the assignments of this code, and identified that the *intended purposes of knowledge organization standards or knowledge organization actions* is the core idea of this code. The scope notes were revised to reflect the focus and level of specificity of codes.

There are 6 codes in the *Knowledge Organization Process* group. They are generated inductively from ethnographic observations and supported by literature (Beghtol, 2002a; Talja et al., 2005) to

represent key components in the knowledge organization process. For this study, my working definition of the knowledge organization process is *the actions in which agents follow standards, practices, and principles to organize resources and produce resource descriptions. Knowledge organization process also includes the influences and consequences of knowledge organization standards and resource descriptions.*

The *warrants* group includes both deductive and inductive codes. Some warrants are well discussed in the literature, and they were added to the codebook before the coding started. Other warrants emerged from the documents, and they were added to the codebook during the coding process. There are 25 codes in the *warrants* group.

Developing the codebook is an iterative process. It requires retrospective coding when new codes are added to the codebook. To improve the coding process, I indexed the cataloging scenarios of each fieldnote and used cataloging scenarios as the unit of coding. Each cataloging scenario is distinguished by the resource of description or the topic of discussion. If an observation session includes the description of cataloging a scroll, crafting a LCSH proposal, and researching a terminology in a knowledge organization standard, the fieldnote of this session documents three cataloging scenarios. If a resource description is created or revised in multiple observation sessions, we can trace the multiple cataloging scenarios to piece up the cataloging process of that resource over time. For instance, I was able to use multiple cataloging scenarios throughout a four-month period to capture the process of proposing and re-proposing a Library of Congress Demographic Group Term. After populating the codebook and coding the documents, I examined the scope note

and examples of each code to merge and split codes, as well as creating hierarchies to reflect the hierarchical relationships between codes.

Conceptual Tools

This section introduces the 8 concepts extracted from literature review. 6 are in the *conceptual tools* code group and 2 are in the *knowledge organization process* group. The introduction explains how these concepts relate to cultural influences in knowledge organization, and how they can help identify manifestations of culture in knowledge organization.

Activity theory

Activity is the unit of analysis of activity theory. An activity consists of subject, object, actions, and operations. Subject is an individual or a group. Object is the goal of an activity and it may change. Actions are the acts to achieve the goal. Routine actions become operations, and operations could be reversed back to actions. Activity theory focuses on the development of an activity, and how activities are influenced by the cultural, social, and historical artifacts, such as human created objects, languages, and signs. Applied in a knowledge organization context, the components of an activity provide the structure and focus of analysis for examining knowledge organization actions (e.g., classification, subject analysis, cataloging, resource description). Further, activity theory emphasizes the goal-oriented nature of knowledge organization actions. Since the goal of an activity may change over time, the intended purpose of a knowledge organization action and its deliverables may differ from its actual use. This is consistent with the assumptions and design of this study, in which RQ2 focuses on the intended purposes and warrants of knowledge organization standards and RQ3 focuses on the warrants in the actual uses of knowledge organization standards. In addition, the consequences of actions are recognized in activity theory. This supports the

inclusion of knowledge organization consequences in the knowledge organization process, and echoes discussions about knowledge organization consequences in the literature. For instance, one particular way of knowledge organization may serve the collective goal of a discourse community or discipline, but not the others (Hjørland, 1997; Nardi, 1996). The consequences could lead to ethical concerns.

Classification as infrastructure

Classification can be seen as a type of infrastructure (Bowker & Star, 2000). Classification shares the characteristics of infrastructure, including (1) embeddedness, (2) transparency, (3) reach or scope, (4) learned as part of membership, (5) links with conventions of practice, (6) embodiment of standards, (7) built on an installed base, and (8) becomes visible upon breakdown (Star & Ruhleder, 1996). Viewing classification as infrastructure provides the perspective of infrastructural inversion -- making the seemingly invisible and taken-for-granted classification prominent (Bowker, 1994). From this angle, we examine knowledge organization standards to identify the underlying warrants, and inquire specifically how cultural warrant may manifest in the standards. We can also observe the embedded structures, principles, standards, and assumptions in cataloging practice. Further, we can trace where knowledge organization standards and resource descriptions "break down" to explore how culture may influence the relationship between human, knowledge organization standards, and resource descriptions.

Configuration

Patterson (2014) defines configuration as "the availability and activation by networks of persons of any ensemble of cultural knowledge and practices structured around a core set of values and norms motivated by a common set of interests, goals, or needs." The default configuration, while

it may change over time, is the focus of a cultural group. Configurations vary in duration, density, complexity, availability, and scale. A configuration can be reproduced and recontextualized. For instance, hip-pop, as a configuration of global scale, can be reproduced and recontextualized in different countries. Individuals have access to many cultural configurations. The number of configurations available for an individual is the configural availability, which links to identity (Hong et al., 2000). Depending on the situation, an individual can shift from one configuration to another. For example, as an Asian woman, I have access to the configuration as an Asian person, and the configuration as a woman. The primary configuration may shift with the context. To operationalize cultural warrant, I use conceptual tools like configuration to analyze cultural manifestations and dissect "Culture," the complex whole that encompasses a variety of aspects and meanings. As Alvesson (2002) notes, we should consider the multiple configurations to capture the context of any cultural manifestation. Since the focus of this concept is on the agents in the knowledge organization process, the code for this concept is listed under the *knowledge organization process* group.

Content and Context

The content and context of resources could carry meanings and shape the interpretations and descriptions. For instance, most Chinese rare books do not have title pages. Upon comparing the RDA guidelines, which gears toward international institutions and collections, and CGCRB (the Cataloging Guidelines for Creating Chinese Rare Book Records in Machine-Readable Form), we see the sources of title information are ranked differently. The ranking rationale is based on the content structure of the resource, which reflects particular temporal, social, and cultural contexts. One other example is stone rubbing, a resource type that prioritizes the preservation purpose. The creation of rubbings reflects the technical context for replication and preservation of artworks (Lee,

2017b). To provide faithful resource representations and identify cultural influences and meanings, it is essential to account for the content and context of resources. In the field, I was able to observe the knowledge organization process of resources with variant formats, contexts, and content, and collect examples of how content and context shape resource descriptions.

Epistemic community

In Haas (1992), an epistemic community is a network of experts who have expertise in a particular domain. These experts may have different disciplinary backgrounds and hail from different countries, but they address the same set of problems through common practice, and they have common criteria for validating knowledge. Members of the same epistemic community share both causal and principled beliefs. They share rationale for social actions and pursue goals that reflect those beliefs. The shared beliefs and knowledge of an epistemic community shape how its members construct realities. By emphasizing a particular aspect of an issue and preferring one interpretation over others, the common beliefs and knowledge could influence policies. An epistemic community is a type of cultural group. In this study, the purpose is not to differentiate epistemic groups from other cultural groups. Instead, it is used to identify sources of cultural influences in the prioritization of warrants in knowledge organization standards and practices. On one hand, when epistemic groups are identified, we can examine whether and how their beliefs influence the prioritization of warrants. On the other hand, in analyzing the prioritization of warrants in knowledge organization standards and practices, epistemic communities are possible sources of influences for examination.

Global-local tension

The tension between adopting global standards for interoperability and developing local standards for local needs has been examined in previous research (Lee, 2015, 2016; López-Huertas, 2013; Mai, 2013; Olson, 2000). Scholars address the global-local tension in different ways. Developing multi-perspective classifications is one example (Lee, 2017a; Matsuda, 2017; Tennis, 2017; Zolyomi, 2017). The global-local tension is closely related to some themes mentioned above. For instance, global-local tension may lead to ethical concerns in knowledge organization, embedded in the resource *context*, or influence the goal of a knowledge organization *activity*. Further, the tension is aligned with the assumption of the classification-as-infrastructure view. Infrastructure has a paradoxical nature. On one hand, infrastructure is built on established standards and practices to support people across time and space (globally). On the other hand, infrastructure is relational and contextual to support *local* and flexible use (Bowker & Star, 2000). Identifying global-local tension in knowledge organization standards and practices help us detect different sources of cultural influences at play.

Three planes in classification activity

Ranganathan (1967) identifies three planes of work in classification activity: idea plane, verbal plane, and notational plane. Ideas originate from the minds of their creators, and they are communicated through language. Language is the medium for the communication of ideas. The ambiguities of language (e.g., homonyms, synonyms) are embedded in the representations of ideas. Recognizing the ambiguities of natural language in the verbal plane, the notational plane helps arrangement or represents disambiguated meanings through approaches such as authority control and identity management. Notations may include language, symbols, and numbers. Class number

is an example. The three planes provide a structure to break down the classification activity, and allow us to discuss cultural influences in classification at a more granular level.

Ethical concerns and issues

In the knowledge organization process, ethical concerns and issues may arise from different components (e.g., standards, information professionals, institutions, representations, information systems) for various reasons. Ethical issues in knowledge organization are not necessarily cultural. However, those issues may point us to prominent manifestations of culture. For instance, an ethical concern about using harmful, inaccurate, or outdated terminology to describe a group of people can lead us to examine the underlying cultural context. Besides terminology, culture may also influence citation order and the prioritization in knowledge organization. Some examples are the focus of themes, categorization, inclusion and reinforcement of some perspectives and exclusion and marginalization of others (López-Huertas, 1997, 2013). The consequences of cultural influences in knowledge organization could surface ethical issues. Through examining ethical concerns, we may identify traces of manifestations of culture. Since the focus of this concept is on the consequences of knowledge organization, the code for this concept is listed under the *knowledge organization process* group.

Codebook

The codebook lists all 37 codes in 3 groups: *conceptual tools*, *knowledge organization process*, and *warrants*, and presents hierarchical structure through numbering. There is a scope note for each code to provide definition and application instructions.

A. CONCEPTUAL TOOLS

A.1. Activity Theory

Scope note: Intended purposes of knowledge organization standards and knowledge organization actions. The purposes may change over time. Knowledge organization standards include classification schemes, catalogs, cataloging rules, and controlled vocabularies. Knowledge organization actions are actions to create resource descriptions.

A.2. Classification as Infrastructure

Scope note: This code highlights two characteristics of infrastructure. (1) Installed bases: the standards, models, or conventions that knowledge organization standards and practices are built on. (2) Breakdowns: the issues of existing standards that motivate the development of new knowledge organization standards and practices.

A.3. Content and Context

Scope note: (1) The historical background or current situations of knowledge organization standards and library community. (2) The situation of the local library. Overlaps with *Agent Warrant*. (3) The purposes and motivations of developing knowledge organization standards. Overlap with *Activity Theory*. (4) The evolving academic environment. Overlap with *Academic/Scholarly Warrant* and *Time warrant*. (5) Mapping existing standards with the new standard. Overlap with *Standard Warrant* and *Time Warrant*, and *Interoperability Warrant*.

A.4. Epistemic Community

Scope note: A network of experts who have expertise in a particular domain, and address the same set of problems through common practices and beliefs. This code may overlap with *Academic/Scholarly Warrant*. The East Asian libraries community in the U.S. is one example of an epistemic community.

A.5. Global-local Tension

Scope note: Describe the tension between different levels of standards/standards of different scales and scopes, and their corresponding agents.

A.6. Three Planes in Classification Activity

Scope note: Idea plane, verbal plane, and notational plane. Assign this code to content about notations or content about discrepancies between the planes.

B. KNOWLEDGE ORGANIZATION PROCESS

B.1. Actions

Scope note: The actions of knowledge organization, including cataloging, classifying, and describing.

B.2. Agents; Social Units

Scope note: Individuals or groups of people who design knowledge organization standards, organize knowledge, create resource descriptions, or consume resource descriptions as users. Assign this code to content discussing configurations of agents.

B.3. Descriptions

Scope note: Knowledge organization deliverables, such as cataloging records and metadata.

B.4. KO Influences

Scope note: The influences knowledge organization standards and descriptions have on people. I identified three prominent types of influences as examples. (1) political influences, (2) ethical influences, and (3) access influences. I further identified four types of access influences. (3-1) Access being influenced by inconsistent descriptions, different standards and practices, and the lack of authority control. This sense overlaps with *Standardization Warrant*. (3-2) Access being influenced by language/script challenges, which overlaps with *Language Warrant*. (3-3) Access being influenced by the lack of specific descriptions, which overlaps with *Specificity Warrant*. (3-4) Access being influenced by adding or lacking access points. This sense overlaps with *Access warrant* under the *Philosophical Warrant*.

B.5. Resources

Scope note: The things being described and/or organized in a knowledge organization process.

B.6. Standards, Practices, and Principles

Scope note: The knowledge organization rules applied in the knowledge organization process. Some examples are classification schemes, metadata standards, cataloging rules, best practices, traditions, principles, workflows, standardized procedures, and guidelines. The rules are of variant levels of scales and scopes.

C. WARRANTS.

C.1. Academic/Scholarly Warrant

Scope note: Warrant the academia and its changes, the existing and emerging disciplines, scholars, and research methods.

C.2. Accuracy Warrant

Scope note: Provide faithful descriptions that are correct, unambiguous, and updated. Warrant the transparency of decisions.

C.3. Adaptability Warrant

Scope note: Warrant flexibility to changes. Adapt to different resource types and content, as well as the online environment and technical aspect of resources and

systems. Assign this code to contents about linked data applications and technical limitations of information systems.

C.4. Agent Warrant

Scope note: Warrant agents in the knowledge organization process. Three prominent types of agent are identified. (1) Agent as creator/author. Assign this code to content about author information, such as variant names, study name, birth and death dates, author's voice and identity. (2) Agent as cataloger, or information professionals who organize and describe resources. (3) Agent as an institution, such as the local library, content provider (e.g., publishers or aggregated databases like EBSCO), and key players in the library community (e.g., OCLC, Library of Congress). Assign this code to content about the purposes and characteristics of the local library.

C.5. Cost/Efficiency Warrant

Scope note: (1) Warrant the time, efforts, and money for maintaining, developing, or creating knowledge organization standards and descriptions. (2) Warrant the time, efforts, and money for making knowledge organization standards and descriptions more accessible.

C.6. Expertise Warrant

Scope note: Warrant the expertise of agents that provide resource descriptions. Three types of expertise are identified. (1) Subject expertise. The expertise of understanding the content/subject or genre/form of resources. (2) Language expertise. Language skill influences the resources a cataloger can describe, the quality and accuracy of descriptions, and the reference sources one can consult. (3) Cataloging expertise. Familiarity with knowledge organization standards, such as MARC, RDA, LCSH, and AAT. This influences the number of "workarounds" a cataloger can apply in practice.

C.7. Geography Warrant

Scope note: Warrant geographic information when making knowledge organization decisions.

C.8. Inference Warrant

Scope note: Warrant inferences. Assign this code to contents about describing resources by inferences. For example, infer author identity from the study name.

C.9. Interoperability Warrant

Scope note: Assign this code to content about data sharing, compatibility, and mapping new standards to existing standards. *Interoperability Warrant* may overlap with but does not require *Standardization Warrant*. As long as there are mappings between standards, it is not always necessary to standardize all local standards.

C.10. Language Warrant

Scope note: (1) Warrant the language of resources. In this sense, co-assign this code with *Resource Warrant*. (2) Warrant terminologies. Contrasting with natural language expressions, terminologies are languages with specific meanings and usages that improve disambiguation and standardization. Assign this code to content about terminologies and controlled vocabularies.

C.11. Literary Warrant

Scope note: Warrant literature in general, or literature of particular discipline(s) or domain(s). For content about selecting the preferred terms in authority control, assign this code with *Standardization Warrant*. For content about warranting the resource of description, co-assign with *Resource Warrant*.

C.11.1. Collection warrant

Scope note: Warrant the local collection.

C.12. Philosophical Warrant

Scope note: Warrant the rationale, philosophy, objectives, or principles of knowledge organization standards or practices. Assign this code or its child codes to content about the objectives of library catalogs: find, collocate, identify, select, obtain, and navigate (Svenonius, 2000), or the five user tasks defined by IFLA: find, identify, select, obtain, and explore. For content about relationships between resources, co-assign with *Resource Warrant*.

C.12.1. Access warrant

Scope note: Assign this code to content about access points and accessibility. This code overlaps with the find and obtain objectives of library catalogs, and it may co-assign with *Technology Warrant*.

C.12.2. Differentiation/Distinction warrant

Scope note: Assign this code to content about providing descriptions to differentiate similar resources. This code overlaps with the identify and select objectives of library catalogs.

C.12.3. Systematic arrangement warrant

Scope note: Catalogers follow guidelines and/or reference other records to create standardized descriptions for systematic arrangement/collocation. This code overlaps with the collocate objective of library catalogs.

C.13. Resource Warrant

Scope note: (1) Warrant the resource of description, including its self-representation, its content/subject and format/genre. For the latter two, use the specific child codes. This sense may overlap with *Literary Warrant*. (2) Warrant the relationships between the described resource and its relevant resources. For instance, relationships between an original work and its translated work or digitization, or the relationships between a rubbing, the stone stele, and the original work.

C.13.1. Content/Subject warrant

Scope note: Warrant the content of a resource, including the language (co-assign with *Language Warrant*) and aboutness of a resource.

C.13.2. Format/Genre warrant

Scope note: Warrant the genre (e.g., poetry) and format (e.g., binding type, printing type, resource type, physical description) of a resource.

C.14. Specificity Warrant

Scope note: (1) Warrant the specificity principle, which instructs catalogers to classify or assign descriptors at the most specific level. Assign this code to content about the specificity of descriptors. (2) Warrant the granularity of the unit of analysis. For example, content about describing at item level or manifestation level.

C.15. Standard Warrant

Scope note: Warrant knowledge organization standards, conceptual models (e.g., FRBR), or principles. Some examples are classification schemes, metadata standards, cataloging rules, traditions, best practices, workflows, standardized procedures, and guidelines.

C.16. Standardization Warrant

Scope note: Warrant consistency in applying knowledge organization standards and establishing shared standards across institutions. Assign this code to content about authority control or identity management.

C.17. Structural Warrant

Scope note: Warrant the structure of knowledge organization standards.

C.18. Time Warrant

Scope note: (1) Warrant the currency of standards. Assign this code to content about keeping standards (e.g., notations, terms) up to date. (2) Warrant temporal information (e.g., publication date, the year of an event) and chronological order. (3) Warrant temporal/historical context (e.g., 18th century, Qing dynasty).

C.19. User Warrant

Scope note: (1) Warrant the needs of users, in a general sense or focusing on particular user groups. (2) Warrant user behaviors, including contents about use and usage. Assign this code to content about conventions and common usages.

Code Co-occurrence Analysis

The most frequently assigned codes are B.3. *Descriptions* (n=288), B.6. *Standards, Practices, and Principles* (n=200), C.13. *Resource Warrant* (n=198), C.12. *Philosophical Warrant* (n=143), B.2. *Agents; Social Units* (n=136), and C.15. *Standard Warrant* (n=110). Considering the types of document analyzed (i.e., editorial documents of knowledge organization standards and fieldnotes of cataloging practices), the high assignments of *Descriptions* and *Standards, Practices, and Principles* are expected. In the two sets of documents, the *agents and social units* that develop, interpret, and apply knowledge organization standards is an important theme. Both *resource warrant* and *philosophical warrant* have multiple aspects. Warranting the resource could refer to its self-representation, content/subject, format/genre, or the relationship between the resource and other resources. Philosophical warrant covers several principles of knowledge organization standards and practices, including the six objectives of library catalogs (Svenonius, 2000). The conspicuous aspects of *resource warrant* and *philosophical warrant* were identified and covered by child codes, respectively. Besides resources and philosophies, existing standards are essential sources of justification for knowledge organization decisions. In the *Level of Standardization* chapter, I will present a close examination of the standards warranted in the three knowledge organization standards and in the field. Following the three warrants, other prominent warrants are C.10. *Language Warrant* (n=98), C.16. *Standardization Warrant* (n=80), and C.19. *User Warrant* (n=80).

One worth noting warrant is C.8. *Inference Warrant*. While not highly assigned, it is a warrant emerged from the fieldnotes. It captures the cases when resource descriptions are based on inferences. For instance, to describe a Chinese rare book, a cataloger may have to infer an author's

identity from the name of the author's study. I added *Inference Warrant* to the codebook to highlight the often nuanced inferences in the resource description process. Inferences rely on the *agent's expertise*. A cataloger needs to understand the resource content and context, and have relevant subject expertise to make inferences. Using the example above, a cataloger must understand the role of study name and its relationship with the study owner's identity in imperial China to infer author information. Familiarity with the cultures presented in the resource influences a cataloger's ability to make inferences and describe the resource.

After reviewing the most frequently assigned codes, I examined the co-occurrence matrix of the top-level/parent codes (See Table 2. Parent Codes Co-occurrence Frequency). For the co-occurrences of all codes, please see Appendix I. In this section, I will selectively discuss some code pairs.

Warrants and the Intended Purposes of knowledge organization standards and actions

As stated in the codebook, the key component of A.1. *Activity theory* that is observed during the coding process is the intended purposes of knowledge organization standards and actions. This code is frequently co-assigned with C.19. *User Warrant*. When editors identify the intended purposes of CCL, NDC, and RDA, meeting the users' needs is mentioned the most, followed by realizing knowledge organization principles and objectives (C.12. *Philosophical Warrant*), improving standardization (C.16. *Standardization Warrant*), interoperability (C.9. *Interoperability Warrant*), and the ability to adapt to different resource types, online environment, and new technologies (C.3. *Adaptability Warrant*). C.3. *Adaptability Warrant* is also frequently co-assigned with B.3. *Description* and B.6. *Standards, Practices and Principles*. The two code pairs capture the emphasis of updating resource descriptions and knowledge organization standards.

Resources and the Global-local tension

A.5. *Global-local Tension* is frequently co-assigned with B.5. *Resources*. C.7. *Geography Warrant* is frequently co-assigned with C.13. *Resource Warrant* and C.18. *Time Warrant* respectively. The three code pairs depict how cultural influences are embedded in the geographical and temporal contexts of resources, and how these cultural aspects of resources could lead to global-local tension in the knowledge organization process.

Agents shape resource Descriptions through Expertise warrant and Philosophical warrant

We can observe high co-occurrences between C.6. *Expertise Warrant* and B.3. *Description*, and another code pair: C.4. *Agent Warrant* and C.12. *Philosophical Warrant*. These code pairs present how agents shape resource descriptions. An agent's expertise, such as the understanding of the context, content, language, and subject matter of the resources, and the familiarity with knowledge organization standards, influence resource descriptions. Upon examining the content that is co-assigned with *Agent warrant* and *Philosophical Warrant*, we can identify three themes. One theme is that agents influence resource descriptions through prioritizing or applying different principles, objectives, or warrants. For instance, the editors of CCL and NDC both critiqued existing knowledge organization standards at the time, and pointed out the needs and warrants they prioritized in the two schemes. Their decisions shaped the schemes and consequently, the resource descriptions that applied the schemes. We can also observe this theme in the field. I observed two catalogers, one was trained in the U.S., and one was trained in China. While sharing some common grounds, the two catalogers prioritized different principles (e.g., transcription principle) and interpreted some key concepts (e.g., authorship) differently. The differences led to variances and disagreements in resource descriptions. One other theme is how philosophical warrant supports an

agent's knowledge organization decisions. The third theme is the efforts of agents or social units in realizing certain knowledge organization principles, objectives, or warrants. For example, the ISNI International Agency and ORCID are agents/social units that support ISNI (International Standard Name Identifier) and ORCID ID (Open Researcher and Contributor ID). The efforts are approaches to realize critical knowledge organization objectives like identification and selection. In short, through co-occurrence analysis, we identify how agents may shape resource descriptions through their expertise, or their emphasis, prioritization, or application of different principles, objectives, and warrants. The cases in the documents take us one step further and show us how culture, as an important source of influence, affects agents' expertise and prioritization.

The following sections will present the key themes that point us to manifestations of cultural warrant in knowledge organization standards and practices. These themes are conspicuous in the editorial documents and the fieldnotes. I will use real case examples from both sets of documents to discuss different aspects of cultural warrant. The themes are conflicts and prioritization of warrants, levels of standardization, resistance, and resources being cultural.

	A.1.	A.2.	A.3.	A.4.	A.5.	A.6.	B.1.	B.2.	B.3.	B.4.	B.5.	B.6.	C.1.	C.2.	C.3.	C.4.	C.5.	C.6.	C.7.	C.8.	C.9.	C.10.	C.11.	C.12.	C.13.	C.14.	C.15.	C.16.	C.17.	C.18	C.19.
A.1.	50	4	7	0	9	4	2	11	18	2	15	18	1	4	10	0	7	0	2	0	10	8	2	15	8	0	8	13	1	5	27
A.2.	4	53	10	1	7	6	1	6	2	0	11	15	4	0	4	0	0	1	0	0	2	6	1	10	6	0	42	4	7	6	7
A.3.	7	10	77	7	6	3	3	25	11	5	28	13	6	0	2	2	1	2	2	1	3	8	6	8	14	2	13	11	1	10	8
A.4.	0	1	7	19	3	1	0	8	3	1	7	6	9	0	0	0	0	0	0	0	0	1	1	2	2	0	2	2	0	7	0
A.5.	9	7	6	3	31	5	0	5	4	2	19	7	2	0	1	1	0	0	0	0	0	15	2	12	8	0	8	5	2	3	7
A.6.	4	6	3	1	5	73	3	8	26	6	18	17	0	2	0	0	1	0	1	0	3	16	8	21	21	2	8	11	5	7	12
B.1.	2	1	3	0	0	3	24	5	4	1	6	8	0	0	0	0	1	1	0	0	1	1	2	4	8	0	0	2	0	1	1
B.2.	11	6	25	8	5	8	5	136	48	9	15	59	3	2	8	5	1	8	5	1	5	13	5	18	25	2	20	19	1	9	18
B.3.	18	2	11	3	4	26	4	48	288	34	18	85	1	10	20	27	3	29	2	2	9	58	26	82	117	15	50	39	1	22	32
B.4.	2	0	5	1	2	6	1	9	34	46	1	22	1	2	2	2	0	5	1	0	2	16	5	21	13	4	9	13	1	6	2
B.5.	15	11	28	7	19	18	6	15	18	1	95	24	7	0	5	1	1	4	3	0	2	20	9	22	49	0	12	11	4	20	12
B.6.	18	15	13	6	7	17	8	59	85	22	24	200	4	4	19	5	3	10	5	0	9	35	11	39	64	10	37	32	2	26	24
C.1.	1	4	6	9	2	0	0	3	1	1	7	4	18	0	0	0	1	0	0	0	0	1	1	2	3	0	4	0	0	8	2
C.2.	4	0	0	0	0	2	0	2	10	2	0	4	0	21	2	0	0	2	0	0	0	5	6	3	6	0	4	5	0	2	3
C.3.	10	4	2	0	1	0	0	8	20	2	5	19	0	2	33	3	0	0	0	0	5	3	2	10	7	0	10	11	0	2	10
C.4.	0	0	2	0	1	0	0	5	27	2	1	5	0	0	3	29	0	3	1	2	0	2	5	14	11	0	6	4	0	0	0
C.5.	7	0	1	0	0	1	1	1	3	0	1	3	1	0	0	0	17	0	0	0	1	1	0	2	1	1	2	1	1	0	6
C.6.	0	1	2	0	0	0	1	8	29	5	4	10	0	2	0	3	0	38	1	0	0	17	6	7	10	2	6	0	0	4	3
C.7.	2	0	2	0	0	1	0	5	2	1	3	5	0	0	0	1	0	1	14	0	0	5	0	3	7	0	1	1	0	6	4
C.8.	0	0	1	0	0	0	0	1	2	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0
C.9.	10	2	3	0	0	3	1	5	9	2	2	9	0	0	5	0	1	0	0	0	18	2	0	3	2	1	6	6	1	1	5
C.10.	8	6	8	1	15	16	1	13	58	16	20	35	1	5	3	2	1	17	5	0	2	98	8	28	31	0	18	14	1	9	16
C.11.	2	1	6	1	2	8	2	5	26	5	9	11	1	6	2	5	0	6	0	0	0	8	46	15	22	0	4	6	0	6	9
C.12.	15	10	8	2	12	21	4	18	82	21	22	39	2	3	10	14	2	7	3	0	3	28	15	143	56	5	28	19	3	18	24
C.13.	8	6	14	2	8	21	8	25	117	13	49	64	3	6	7	11	1	10	7	1	2	31	22	56	198	7	19	13	3	29	23
C.14.	0	0	2	0	0	2	0	2	15	4	0	10	0	0	0	0	1	2	0	0	1	0	0	5	7	19	6	1	1	0	0
C.15.	8	42	13	2	8	8	0	20	50	9	12	37	4	4	10	6	2	6	1	0	6	18	4	28	19	6	110	20	8	11	14
C.16.	13	4	11	2	5	11	2	19	39	13	11	32	0	5	11	4	1	0	1	0	6	14	6	19	13	1	20	80	0	9	12
C.17.	1	7	1	0	2	5	0	1	1	1	4	2	0	0	0	0	1	0	0	0	1	1	0	3	3	1	8	0	15	0	2
C.18.	5	6	10	7	3	7	1	9	22	6	20	26	8	2	2	0	0	4	6	0	1	9	6	18	29	0	11	9	0	63	8
C.19.	27	7	8	0	7	12	1	18	32	2	12	24	2	3	10	0	6	3	4	0	5	16	9	24	23	0	14	12	2	8	80

Table 2. Parent Codes Co-occurrence Frequency.

4. Conflicts and Prioritization of Warrants

Conflicts between warrants and prioritization of warrants are common themes in both the editorial documents and the fieldnotes. When examining the documents from an infrastructural inversion perspective (Bowker, 1994), I look for "breakdowns," in the forms of conflicts and prioritization, to identify the seemingly invisible warrants in "infrastructures" like knowledge organization standards. Conflicts and prioritization of warrants are easier to identify and observe. They serve as signs that call for further investigation. Through exploring the reasons behind the conflicts and prioritization of warrants, I identify cultural influences and manifestations of cultural warrant in the knowledge organization process. In the following section, I will introduce the cases of the three knowledge organization standards. We will see how culture influences the contexts (e.g., the historical backgrounds of CCL and NDC, and the library communities at the time of standard development), and how culture shapes the intended purposes and prioritization of warrants of the standards. After presenting the three cases, I will discuss two major causes of the conflicts of warrants in the field: differences and prioritization.

CCL: Academic warrant vs. Resource warrant

The first edition of CCL (the New Classification Scheme for Chinese Libraries) was developed by the editor Liu and published in 1929 in Nanjing, China. Liu (1929) elaborated on the motivations and purposes of developing the CCL. At that time, Liu observed rapid changes in the Chinese academia and evolving user needs. Many disciplines shifted the scopes with expanded breadth or depth around that time. Some disciplines apply new research methods which shape the nature of those studies and require new classification. For instance, studies on plants and animals used to be

classed under the *Masters* (Zhi. 子) -- *Books on Material Culture and Nature Studies* (Pulu 譜錄) category in *Siku Quanshu*[1]. Liu suggested that modern studies on plants and animals should be classed under *Zoology* and *Botany*. Liu also saw the necessity to accommodate new knowledge (e.g., physics and chemistry) and increase the level of specificity in classifications. Besides identifying the evolving disciplines and needs, Liu described his observations of Chinese bibliographic classifications at the time. There was a lack of modern and standardized Chinese bibliographic classification. The established *Siku Quanshu* categories have flawed principles and they could no longer accommodate all Chinese books. As a result, libraries often used different classifications. CCL was one of the many modern Chinese classifications developed at the time (Tsien, 1952). The lack of standardization makes interlibrary collaboration challenging. It was also inconvenient for users to learn classification schemes when visiting different libraries. Adding to this complexity, some libraries applied the *Siku Quanshu* categories to "old books" and developed modern classifications for "new books." The distinction between old and new books, however, could be vague and arbitrary. Some other libraries suggested adopting established Western classifications, such as the Dewey Decimal Classification (DDC), which was at its 12th edition. However, Liu pointed out that the disciplines, research methods, and research questions in China and the West were so different that full adoption of a Western scheme would be problematic. In Liu's view, "forcing ourselves to imitate the West is like cutting the feet to fit the shoes." (「勉強模仿，近於削足適履。」) Also, the *Siku Quanshu* categories are divided by format and subdivided by discipline. To cater the new needs from the evolving Chinese academia, Liu saw the urgency of developing a discipline-based Chinese classification. He developed CCL, a modern

[1] *Siku Quanshu* is the largest collection of books in the Chinese history. Its catalog is divided into four categories: Classics (Jing. 經), Histories (Shi. 史), Masters (Zhi. 子), and Collections (Ji. 集).

classification for Chinese libraries that is divided by disciplines, and then by format, geography, time, and language.

Based on the context and motivations of developing the CCL, we can identify several warrants Liu applied and prioritized. First, Liu identified the common but difficult goal of having a standardized Chinese bibliographic classification, which indicates *standardization warrant*. The prominent motivation of accommodating new knowledge and catering the needs of contemporary Chinese academia highlights *academic/scholarly warrant*. Along the same vein, replacing the established, format-based *Siku Quanshu* categories with a discipline-based classification is an example of *prioritizing academic/scholarly warrant over resource warrant*.

Similarly, we can identify warrants in Liu's elaboration of CCL's goals. For instance, Liu *prioritized user warrant over philosophical warrant* through emphasizing practical uses over classification theory. Also, Liu aimed to develop a classification scheme that is "expansive, neutral, and flexible." He pursued a scheme that can accommodate both Chinese and foreign knowledge, and eliminate the arbitrary distinction between the old and new books. To improve scheme flexibility, Liu adapted the decimal notation system of DDC and applied it to CCL. While CCL uses numerical notations and hierarchical structure, it is not necessary to divide every class into 10 subclasses. These goals and designs highlight the *adaptability warrant*.

After reviewing the context, motivations, and goals of developing the first edition of CCL, we see the emphasis of *standardization warrant* and *adaptability warrant.* Adaptability warrant covers the scheme's ability to adapt and accommodate new and foreign knowledge, as well as the

flexibility to adapt the classification structure. These two warrants reflect the particular social, cultural, and temporal context at the time. With the emergence and introduction of new and foreign knowledge, the Chinese academia was experiencing rapid changes, which include cultural changes in epistemic communities (e.g., changing the breadth and depth of disciplines' scopes). We also see conflicts and prioritization of warrants, such as prioritizing *academic/scholarly warrant* over *resource warrant* through prioritizing different characteristics of division (i.e., discipline, format). This conflict indicates a change of users' information needs and search behaviors. Scholars, as the major intended users of the scheme at the time, prefer organizing and accessing knowledge through disciplinary classifications over format categories. This change of preference could be a sign of shifting culture in the epistemic communities in Chinese academia then. Also, when Liu specified his stance of emphasizing practice over theory, he prioritized *user warrant over philosophical warrant.* This indicates that Liu recognized different agents (e.g., practitioners, general users, classificationists). It also gives us an idea of how Liu would weigh and represent the different cultures and perspectives of these agents when he designed CCL. This information is often too implicit to infer if the editor did not specify it explicitly. Through identifying the warrants and conflicts or prioritization of warrants, we can further investigate the role of culture in those cases, and trace the possible sources of cultural influences in the knowledge organization process.

NDC: Philosophical warrant and Resource warrant vs. Language warrant

The first edition of NDC (Nippon Decimal Classification) was developed by Mori and published in 1929 in Osaka, Japan. According to the *Foreword* written by Mamiya Fujio (Mori, 1929), the Japanese library community started thriving in 1872, which was 4 years before the publication of the first edition of Dewey Decimal Classification (DDC). However, after more than 50 years, there

was still a lack of a Japanese classification scheme that was applied nationally. Libraries used different classification schemes and developed their own ways of organization. Some classifications claimed to be adaptations of DDC, while Mori considered them as "superficial imitations" of DDC. From Mori's perspective, those schemes might look like DDC through applying decimal notations, but there were fundamental differences ("似而非," looks alike but different in nature) because the schemes failed to incorporate mnemonic devices. In addition, most Japanese classifications at the time did not have indexes. This led to inconsistent applications of the same scheme. The lack of standard and index negatively affected users, librarians, and inter-library collaboration. Standardization became a topic of discussion at conferences and in publications.

Recognizing the importance of standardization, Mori saw the necessity of developing a classification scheme for Japanese libraries. On one hand, Mamiya regarded DDC as the best practical classification scheme worldwide, and suggested imitating DDC to develop the Japanese scheme. On the other hand, Mori addressed concerns toward full adoption of any Western classifications. Mori foresaw issues in the religion, philosophy, law, literature, and history classes upon fully adopting a Western scheme. Also, Mori emphasized the need to prioritize books about Japan. To address this global-local tension, Mori adapted DDC instead of fully adopting it. One of the goals of developing NDC is to inherit the true spirit of DDC and not just superficially imitate it. Mori carefully designed NDC to capture the strengths of DDC while incorporating localizations. For instance, NDC includes mnemonic devices and indexes. The number 1 was used as the notation to prioritize Japan related materials (e.g., 210 is Japanese history, and 810 is Japanese language). To classify children's books, Mori provided several notation options. Librarians can add J (Jidō.

児童. Children), Y (Yōnen. 幼年. Juvenile/Childhood), 子 (Ko. The first Kanji character of 子供 (Kodomo). Children), or コ (Ko. The first Katakana character of コドモ (Kodomo). Children.) before class numbers to specify that the books are for children. Among the four options, Mori recommended using the letter J because it can represent both Jidō and Juvenile. The thoughtful design took mnemonic, Japanese, and English into account. As shown in the example, Mori added characters *before* the decimal notations to ensure that the functions of the classification and relative index remain intact, while gaining flexibility of the arrangement to prioritize books about Japan. Mori emphasized the importance of prioritizing local users' needs in classification: "Classify books from a practical perspective. Assign books to classes that are the most appropriate for users. When there are local concerns, classify and shelve the books to serve local needs." The context of the local library was also taken into consideration: "Besides the content of the books, we should also take the nature of the library, its mission statement, and its stance into account when classifying." Furthermore, Mori increased the flexibility of division, so that it was not required to subdivide every class into exactly 9 subclasses. One other purpose of developing the NDC was to realize the subject collocation of all books. Before NDC, it was common for libraries and classifications to separate Japanese books from non-Japanese books. Mori found this problematic because it undermined subject collocation, a critical purpose of classification, and disrupted the arrangement of translation works. Hence, Mori developed NDC, a classification scheme that was rooted in Japanese materials, but applied to books in different languages and formats.

Based on the editorial documents of NDC, we gained a better understanding of the context, motivations, and purposes of developing NDC. In examining the documents, some warrants stood out. The goal of establishing a standardized Japanese classification scheme is an example of

standardization warrant. The emphasis on including indexes in NDC for consistent classification is an example of both *standardization warrant* and *systematic arrangement warrant*, which is a child code of *philosophical warrant*. The motivation of realizing the true spirit of DDC through applying decimal notations and incorporating mnemonic devices and indexes represents *structural warrant*. We can identify traces of *user warrant* in Mori's emphasis on prioritizing books about Japan and local users' needs, as well as the incorporation of mnemonic devices for easier use. Besides general users, Mori took the local library into account, which addressed *agent warrant*. The thoughtful design of adding J as a mnemonic character for children's books is a design that accounted for both Japanese and English. It is an example of *language warrant*. Among these warrants, we can further investigate traces of cultural influences. For example, the culture(s) of the local user communities could shape users' needs and the local library, and become part of *user warrant* and *agent warrant*. Cultural influences may also embed in languages and overlap with *language warrant*.

Besides prominent warrants, we can identify tension and conflict between warrants. Mori addressed the tension between fully adopting DDC and developing a scheme for the Japanese library community by carefully adapting DDC with thoughtful modifications. It is an instance of balancing between *standard warrant* and *user warrant*. Similarly, Mori found balance between *structural warrant* and *adaptability warrant* through imitating the structure of DDC (e.g., decimal notation, relative index, mnemonic devices) on one hand, and localizing mnemonic characters and approving flexible class subdivision on the other hand. In order to realize subject collocation, Mori used one scheme for all books to eliminate the distinction between classifying Japanese and non-Japanese books. This is a conflict between *philosophical warrant* (collocation as a critical

objective of library catalogs) and *resource warrant* (the content and subject of resources), and *language warrant* (resource languages). In this case, philosophical warrant and resource warrant were prioritized over language warrant.

We can further observe the role of cultural influences in these three examples. In the first two cases, the major cultural perspective represented by DDC differs from the cultural perspectives of the Japanese local communities. The cultural differences shape the scheme in variant ways, such as the focus of classes (e.g., religion, philosophy, law, literature, and history classes) and the mnemonic characters. Cultural differences also indicate different assumptions about the intended users and their needs. The cultural influences were strong enough to cause tensions and affect Mori's design decisions. In the third case, however, realizing a knowledge organization principle (i.e., subject collocation) was prioritized over the cultural influences that were embedded in the resource languages. While the warrants that are supported by cultural influences may *win* or *lose* in conflicts and prioritizations of warrants, and different sources of cultural influences may support different warrants, tracing the conflicts and prioritizations of warrants allows us to narrow down the scope of investigation and capture manifestations of culture in the knowledge organization process. After identifying manifestations of culture, we can then reflect on how and where to consciously account for culture, that is, warrant culture, in the knowledge organization process.

RDA: User warrant vs. Standardization warrant

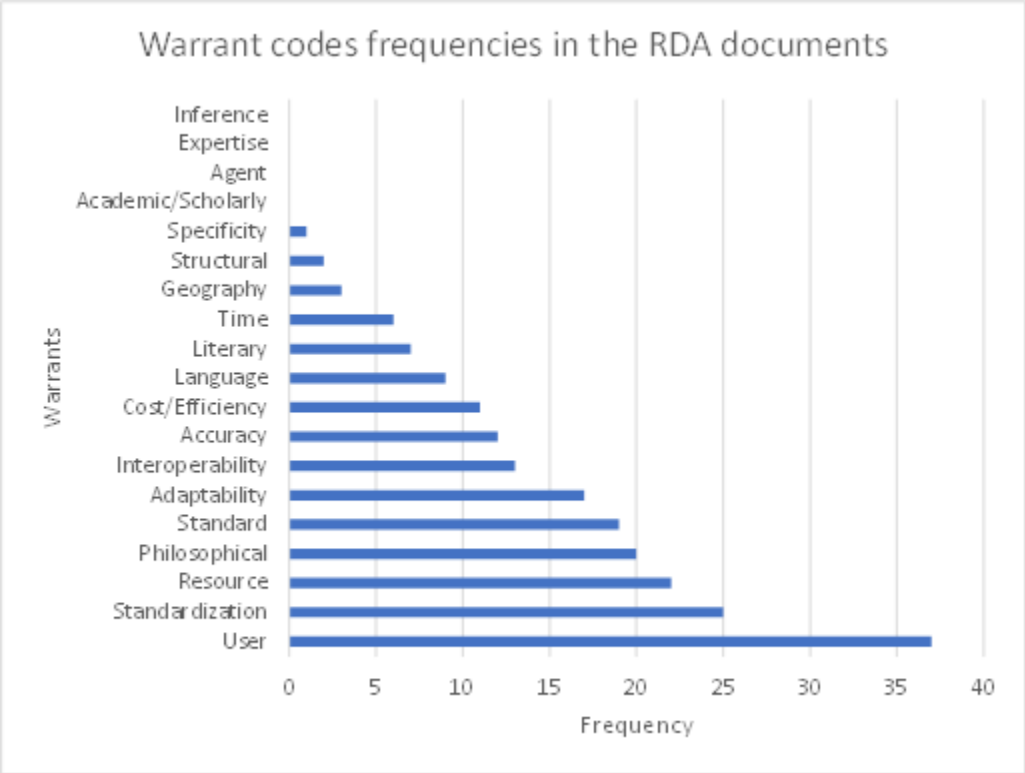
According to the editorial documents of RDA: (1 & 2) the 2004 and 2009 editions of its *Objectives and Principles*, (3) Strategic Plan 2005-2009, (4) Strategic Plan 2020-2022, (5) *Purpose Statement*, and Delsey (2016), RDA was developed by its Joint Steering Committee (JSC) as a revision of

AACR2 (Anglo-American Cataloguing Rules, 2nd edition). There are several motivations to revise AACR2. One motivation is to accommodate and improve access to new resource types in the digital environment (*Resource warrant* and *Access warrant (under Philosophical warrant)*). One other motivation is to align with other metadata standards for digital resources, such as RDF and SKOS (*Standard warrant* and *Interoperability warrant*). Aligning with the FRBR and FRAD conceptual models (*Standard warrant*) and adapting to new database structures (*Adaptability warrant*) are important motivations as well.

Succeeding the *Paris Principles*, IFLA's *Statement of International Cataloguing Principles* (2009, 2016) serve as the basis for international standardization in cataloging. The principles are closely related to RDA, the major international cataloging standard that succeeds AACR2. We can see some of the motivations for updating the statement are similar to the motivations of developing RDA. For instance, the statement was updated to accommodate the online, digital, open access environment, new resource types, and new features of discovery tools (*Adaptability warrant* and *Resource warrant*). Besides emphasizing the interoperability and accessibility of data, IFLA also consciously accounts for new user groups and user behaviors (*Interoperability warrant, Access warrant (under Philosophical warrant)*, and *User warrant*). Among the prominent warrants in the motivations of developing RDA and updating the cataloging principles, IFLA's emphasis on new user groups indicates the awareness of diverse user groups and consequently, diverse user needs, behaviors, and cultures. This recognition sheds light on a source of cultural influences in the international cataloging principles.

The RDA editorial documents list many objectives, and most of them can map to warrants rather directly. For instance, in the *Strategic Plan 2005-2009*, one of the goals is to "enable users to find, identify, select, and obtain resources appropriate to their information needs." This goal highlights *Philosophical warrant* and *User warrant*. Instead of going through all objectives and naming the warrants, I provide a chart to present the warrant codes and their frequencies of assignment in the RDA editorial documents (See Graph 1). We can see the most frequently mentioned warrants are *User warrant*, *Standardization warrant*, *Resource warrant*, *Philosophical warrant*, *Standard warrant*, and *Adaptability warrant*. The *Standardization warrant* code is assigned to the content that highlights the importance of international standardization in cataloging (e.g., standardizing the description and construction of access points), and how the consistency and uniformity in resource description can improve the sharing of bibliographic and authority data. The other warrants are covered in the abovementioned context and motivations of developing RDA.

One code that is not frequently assigned but worth noting is *Geography warrant*. In *Strategic Plan 2020-2022*, the JSC recognizes gaps in the adoption of RDA in different regions, and sets a goal to increase RDA adoption through outreach and developing policies, procedures, and practices that are relevant and representative to all regions. The goal serves as a good example of the perspectives from the global side in the global-local tension. This is in contrast to the local side perspective in CCL and NDC, which focuses on prioritizing local needs and culture. As the editorial committee of an international cataloging guideline, the JSC is aware of the diverse user groups. Despite the Anglo-American focus of RDA's predecessor, the JSC seems devoted to increasing inclusivity and representativeness of diverse users and their needs and cultures. This echoes IFLA's emphasis on accommodating new user groups.



Graph 1. Warrant Codes Frequencies in the RDA Editorial Documents

In the documents, we can identify tension and potential conflict between warrants. For instance, there is the goal to adapt to the digital environment and new resource types on one hand, and the goal to remain compatible with existing database structures and previous standards on the other hand. Tension may arise in the efforts to balance these goals, which address different warrants. In this case, *Adaptability warrant* and *Resource warrant* may conflict with *Standard warrant* and *Interoperability* warrant. Also, some instances in the cataloging guidelines provide multiple options for practitioners without clear prioritization. While offering sanctioned options increases flexibility of the guidelines, possible conflicts between warrants may occur when the options support different warrants. For example, when selecting preferred names, catalogers are instructed to use the "name or form of name *most commonly found in resources* associated with that person, family, or corporate body, or a *well-accepted* name or form of name in the *language and script*

preferred by the agency creating the data." Similarly, when recording title information, catalogers should use "the title *most frequently found in resources embodying the work in its original language*, the title as *found in reference sources*, or the title *most frequently found in resources embodying the work*." The guidelines list sources of preferred names and titles without clear prioritization. For preferred names, the three options represent *Literary warrant*, *User warrant*, and a combination of *Language warrant* and *Agent warrant* respectively. For title information, the first option accounts for the combination of *Literary warrant*, *Resource warrant*, and *Language warrant*. The second option represents *Literary warrant*, and the third option emphasizes *Resource warrant*. In both cases, it is possible to connect different cultures to different warrants. For instance, when a cataloger describes a Chinese rare book in the U.S. context, the culture embedded in the *Resource* (e.g., resource language, format, and temporal context) is different from the culture (e.g., language and script) that is preferred by the U.S. *Agency* that provides resource description. The tension between warrants may point us to conflicts between cultures.

The JSC recognizes the conflicts of warrants. In the *RDA Objectives and Principles* (2009), the JSC pointed out that sometimes, there are unavoidable tradeoffs between principles. "It should be noted that while the statement of objectives and principles serves to provide overall guidance for the development of RDA, trade-offs sometimes have to be made between one principle and another." The JSC provides two examples of tradeoffs. One tradeoff is between the principle of uniformity and the principle of common usage, which represents a tension between *Standardization warrant* and *User warrant*. Another tradeoff is between the principle of accuracy and the principle of transcription. This depicts the tension between *Accuracy warrant* and *Resource warrant*. Similarly, in IFLA's *Statement of International Cataloguing Principles* (2009),

"the convenience of the users of the catalogue" is considered the first of all objectives. In the General Principles section in the 2016 edition of the Statement, we see a prominent example of prioritization of warrants: "the convenience of the user is the most important ... If there is a conflict among principles 2.2-2.13, the principle of interoperability should be rated higher than others." As the statement instructed, *User warrant* and *Interoperability warrant* are prioritized over others. The highly emphasized user warrant covers users' culture(s). The interoperability between standards can lead to examination of the culture(s) represented by different standards. One interesting observation is that RDA *Objectives and Principles* suggests finding a balance between different principles, while the IFLA statement instructs users to prioritize specific warrants over others. With either attitude, we again detect possible sources of cultural influences in the knowledge organization process through observing and identifying conflicts and prioritization of warrants.

After reviewing the three cases: CCL, NDC, and RDA, we can see the CCL and NDC are classification schemes that share similar temporal context and represent the perspective of the local side in the global-local tension. The editors of both schemes address the need to develop a modern classification standard for the local community. In response to the global-local tension, while the purposes of developing the two schemes are not identical, we see a common emphasis on prioritizing local needs. Liu developed CCL, a discipline-based classification, to cater the needs of local users, the Chinese academia at the time. Mori developed NDC as a localized scheme that prioritizes Japanese books and serves local users and libraries. RDA, on the other hand, is a contemporary international cataloging guideline, and it is still under development and revisions. From the perspective of the global side of the global-local tension, we see the efforts to take diverse

users into consideration. In contrast to prioritizing local needs and culture, the JSC has been working on incorporating the needs from diverse users, regions, and cultures in RDA to improve the adoption and application of this guideline.

Conflicts of Warrants in the Field: Differences and Prioritization

In my ethnographic fieldwork, I observed many instances of conflicts of warrants. After reviewing the instances, I identified two major categories of warrant conflicts: differences and prioritization. The former includes differences in the principles and beliefs of epistemic communities, as well as the different rationales underlying knowledge organization standards. The latter includes the tension triggered by competing warrants. Some prominent conflicts for prioritization are between *Resource warrant* and *Agent warrant*, between *Resource warrant* and *Standard warrant* or *Standardization warrant*, between *Agent warrant* and *Standard warrant*, and between different *Philosophical warrants*. The following section will present cataloging scenarios as examples of the two categories of warrant conflicts.

Differences

"The Western Way of Thinking is Very Different from the Chinese Way of thinking.": Philosophical Warrant and Standardization Warrant vs. Cost Warrant

In one observation session, I observed cataloger Q (pseudonym) and her interactions with professor Z (pseudonym). They were working on an international cataloging project, in which rare books and special collections in two Asian/East Asian academic libraries were cataloged. My field site is one of the two libraries. Q is a U.S. trained cataloger and a Chinese native speaker. She is experienced with international and U.S. knowledge organization standards. Since many resources

are in Chinese, the project invites Z, a professor and a librarian in China, as a visiting consultant. Z is a subject expert and an active member in the Chinese rare books and special collections cataloging community in China. In this cataloging project, student assistants did bibliographic verifications to identify resources that require original cataloging and resources that need adaptations of existing cataloging records in the OCLC WorldCat. WorldCat is an international union catalog of "the world's largest network of library content and services." (OCLC Online Computer Library Center, n.d.). Assistants would process the resources that could be copy-cataloged, and pass other resources to professor Z. Using his subject knowledge, Z created two cataloging records for each resource. One record used the metadata template of the Rare Book Union Catalogue of Chinese Academic Library and Information System (CALIS). The template is based on Dublin Core, and Z is very familiar with it. The record would be added to the CALIS catalog. The other record followed the international and U.S. standards like RDA, CGCRB[2] (Cataloging Guidelines for Creating Chinese Rare Book Records in Machine-Readable Form), LCC, and LCSH. The record was then reviewed and revised by Q, who is familiar with these standards, before sharing through WorldCat. During this project, I observed the communications and collaboration between Q and Z, who are trained in, and connected to, different epistemic communities: the U.S. library community and the rare book community in Chinese academic libraries. This scenario was the first time I met Z.

[2] CGCRB (Cataloging Guidelines for Creating Chinese Rare Book Records in Machine-Readable Form) is a cataloging standard developed by the RLG (research libraries group) and international scholars and librarians. They started developing it in 1989, published it in 2000, and revised it in 2009. The intended scope of this cataloging guideline is "for libraries following ALA/LC cataloging rules that wish to catalog Chinese language printed books and bound manuscripts produced in China before 1796 (i.e., through the Qianlong reign). Chinese language books published in Japan, Korea or elsewhere as well as books published in China in Manchu, Mongolian, Tibetan or other languages are beyond the scope of these guidelines." There are some similarities between RDA and CGCRB because both standards are based on AACR2.

In this observation session, I observed Q reviewing a record of a multi-volumed Chinese rare book series. After examining the set of books at hand, Q could not find any editor information, but there was editor information in the record. According to the transcription principle, catalogers should transcribe information from resources. If information is not available in the resource, catalogers can consult reference sources, and record information and its sources in brackets. This principle has been practiced in international cataloging rules such as AACR2 and RDA. In this case, Q was not sure if it was she failing to locate editor information in the books, or Z forgetting to add brackets for the editor information. As an attempt to identify the source of editor information, Q searched a Chinese database and found records of other editions of the same work. Some records list the same editor, but none of those records specify the information source. Q then looked up records of this book series using OCLC Connexion, an online cataloging tool that many catalogers use to create both bibliographic and authority records. Through Connexion, catalogers can search records in WorldCat. Q could not find editor information sources in these records, either. Feeling frustrated by the time-consuming review process and the failure to trace information sources, Q sighed, "The Western way of thinking is very different from the Chinese way of thinking." Finally, Q contacted Z for a brief meeting. Q asked Z about the source of editor information in the record he created. Z said that other records in a Chinese database provided the editor information, and Q could trust the other records and copy it. Q explained the transcription principle and emphasized the requirement of adding brackets to non-transcribed information. Z pointed out that tracing and documenting information sources like this would take a lot of time and effort, while Q said that she was following the cataloging rules. After the meeting, Q searched Connexion and found a record describing a different edition of this book series. The record was created by an institution that,

according to Q, usually creates high quality records. In that record, the editor information was in brackets, with a note verifying that information using another source. Q decided to trust this record and copied its note of verification, and added brackets around editor information in the record she was reviewing.

In this cataloging scenario, we see conflicting warrants that lead to different cataloging decisions and descriptions. Q's emphasis on following cataloging rules and the transcription principle prioritizes *Philosophical warrant* and *Standardization warrant*. Q's actions of applying brackets and documenting information sources are efforts to maintain the shared expectations and assumptions among the library communities that adopted the transcription principle (e.g., AACR2 and RDA). On the other hand, Z prioritized *Cost warrant*, in the form of the time and effort for tracing, verifying, and recording information sources.

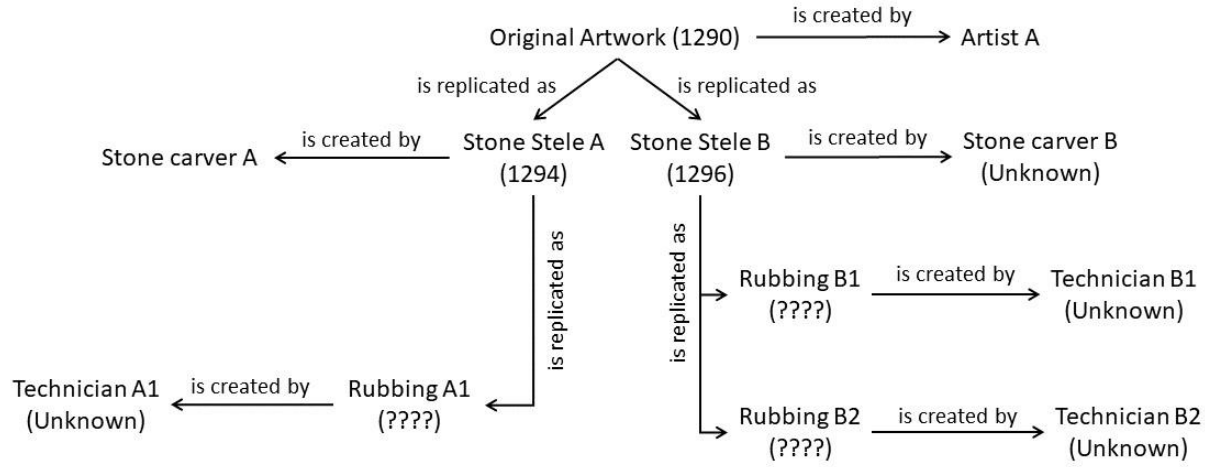
Both Q and Z mentioned *trust* in their cataloging process. Z trusted the information in other records in the Chinese database. Q trusted the record in WorldCat that was created by a particular institution. Trust factors in cataloging decisions, especially for copy-cataloging and adapting existing records, but often in a nuanced way. Catalogers may choose to trust one record over others because the quality of description is higher, and the description follows the cataloging guidelines. However, we also know that knowledge organization standards are cultural, and communities may use different standards, or use the same standards but with different localizations (e.g., local best practices). If catalogers tend to trust what best aligns with the guidelines and practices that they are familiar with, the subtle factor of trust becomes a hint of cultural influences. Through thick descriptions in the field, we can not only see how trust influences the cataloging process, but also

how trust indicates the communities and cultures a cataloger relates to. Also, the "Western way of thinking" and "Chinese way of thinking" in Q's quote should be interpreted with flexibility. Based on the context, it serves as an easy and generalized contrast that represents the differences between the U.S. library community that Q shares cataloging practices with, and the Chinese rare books and special collections cataloging community in China that Z relates to. In the previous discussion, we identified tension between *Cost warrant* and the combination of *Philosophical warrant* and *Standardization warrant.* It should be noted that different communities may emphasize different principles and standardization approaches, and the prioritization of warrants may differ case by case. In another case, Q may prioritize cost over another principle, and in yet another case, Z may prioritize certain principle over cost. Identifying the conflict and tension between warrants, however, allows us to trace sources of cultural influences, such as the cultures of the library communities that Q and Z relate to respectively.

"The RDA Way of Cataloging is Flipping My Records Upside Down!": User Warrant and Resource Warrant (Format) vs. Literary Warrant and Resource Warrant (Content)

In the cataloging project, Q and Z described several Chinese stone rubbings. Rubbing is a peculiar resource format. The creation of rubbings is motivated by preservation purposes, especially before the development of contemporary copy and printing techniques. In order to preserve paper-based artworks, such as calligraphies and paintings, people replicate artworks by carving on stone steles. However, steles may decay over time. To further preserve the content of the original artwork, people attach a paper to its stone stele replication, and rubbed the paper against the stele with ink to "print" the content down to a new sheet of paper, which is rubbing. The creation of the original artwork, the stone stele, and the rubbing can happen many years apart, and the process involves multiple agents. When describing a rubbing, it is important to show the relationships between the

rubbing and the stele and original artwork, and specify the roles of different agents, such as the creator of the original artwork, the stone carver, and the technician who created the rubbing. Adding to the complexity, an original artwork can be replicated on multiple stone steles. Technicians can create multiple rubbings from the same stele at different times. That is, depending on the condition of the stone stele (e.g., a stele may decay, or become half-destroyed because of weather or human forces), rubbings created from the same stele at different times may present different content and of different qualities. The graph below depicts a hypothetical but possible relationship network between multiple artifacts and agents.



Graph 2. The Creation of Rubbings

As presented in Graph 2, the information about the stone carvers and technicians are often unknown. While in the Western tradition, stone carvers may be treated as artists or creators, in the traditional Chinese context, stone carvers and technicians were considered mechanics, thus their identities often remain unknown. At the time when only a small group of elites were literate, technicians were likely illiterate. They worked like printers and did not leave their names on the rubbings. Information about the creation of rubbings is often lacking as well, because rubbings were treated as a surrogate of the original artwork. While users may care about the creator and

creation date of the original artwork, they might not care much about when and by whom a rubbing was created. As a result, the creation years of rubbings often depend on subject experts' best guesses. However, as mentioned above, the creation years of rubbings could reflect the condition of the stone stele. If stone stele B decayed or broke after the creation of rubbing B1, the content of rubbing B2 would be different from B1. In this cataloging project, catalogers used CGCRB to describe Chinese rare books, and used RDA to describe other resources, including rubbings. How would RDA and the underlying conceptual model FRBR apply to rubbing, a complex and cultural resource type?

Q explained the application of RDA and the FRBR Group 1 entities: Works, Expressions, Manifestations, and Items (WEMI) to rubbings (Carlyle, 2011; Tillett, 2005). Instead of treating stone steles and rubbings as replications of the original artwork, all three types of artifacts are treated as Works that relate to one another. Hence, the creator and creation year of the three Works are different. Using Graph 2 as an example, the original artwork was created in 1290 by artist A. Stone stele A was created by stone carver A in 1294. Rubbing A1 was created in an unknown year by an unknown technician. In the record of rubbing A1, cataloger can add links to the original artwork or the stone stele A as related works. Q was aware of the differences between this descriptive model and the cataloging rationale and practices of the Chinese rare book and special collections community. In order to communicate with Z, Q prepared another example using Mona Lisa, the famous painting created by Leonardo da Vinci around 1503-1517. The scenario Q provided is to describe a photo of Mona Lisa she took in 2014. Following the FRBR model, Q is the creator of the photo, and the creation year is 2014. It would be misleading and confusing if we list Leonardo da Vinci as the creator of the photo, or list 1503 as its creation year. However, after

hearing Q's explanations, Z could not agree with using the FRBR model to describe Chinese rubbings. Z emphasized that the original artwork should be the core of the cataloging records of its replicates (e.g., rubbings). After Q described the interaction with Z, she sighed: "There is a big gap, as great as the Grand Canyon, between the West and China."

Shortly after this observation session, I had a chance to observe Z's work alone, with his consent. Through this opportunity, I was able to see the other side of the story. In this session, Z showed me how CALIS (the Rare Book Union Catalogue of Chinese Academic Library and Information System) uses the original artwork as the unit of description, and why this makes more sense than applying the RDA. One reason Z pointed out is being able to present critical metadata that serves users' needs in the simple display. After an initial search in the catalog, users see a list of search results. A selective set of metadata is listed next to each result. This simple display helps users identify and select relevant resources without clicking through the full record of each resource. In CALIS, the selective metadata set includes title, author/creator, publication year/period, printing type, volume, location, identifier, and a thumb nail of a scan image. Users can view scan images of many resources in the full record display. Using a rubbing of an epitaph as an example (See Figure 1), if we follow RDA to describe it, the title would be transcribed and written in lengthy classic Chinese that may be challenging to decipher (e.g., *Wei gu shi chi jie shi zhong du du zhong wai zhu jun shi si kong gong ling yong zhou ci shi wen xian Yuan gong mu zhi ming*. 魏故使持節侍中都督中外諸軍事司空公領雍州刺史文憲元公墓誌銘). The creation date is 1912-1949?, the estimated time period of which the rubbing was created. The creator is the technician who created the rubbing, and is unidentified. In CALIS, instead of transcription, catalogers use their subject expertise to assign succinct titles to rubbings of epitaphs. The assigned title may include

information of printing type, time period of the original epitaph, and whose epitaph it is. In this case, the assigned title is *Yuan Hui mu zhi* (元暉墓誌, the epitaph of Hui Yuan). Another example of assigned title is *Fu ke Han Zhu Boling bei* (覆刻漢朱伯靈碑 Recarve of Boling Zhu's (Han dynasty) epitaph). To inform users of the original artwork of a rubbing, information about the title, author/creator, and publication time is based on the original artworks, and other metadata is based on the rubbing. Z explained the rationale is to better serve the users. "Users access the rubbings because they want to see the original object. Users may not be able to travel to the Xi'an Stele Forest, and the original object may not exist now." These quotes re-emphasize the original artwork centered description, and the view of treating rubbings as surrogates instead of Works. Z pointed to the search results display and asked: "How could it be helpful to users if we use RDA to catalog, and they see all the information [pointing to the author and publication information fields] as "unknown?" This way of cataloging [RDA] cannot distinguish [rubbings]… the original object is the critical element for distinguishing and identifying rubbings." Z expressed his frustration with RDA "Using RDA, I am not allowed to record the title of the original object, not the publication information of the original object… none of them! [sic] The RDA-way of cataloging is flipping my records upside down."

In this cataloging scenario, we see the differences between cataloging communities lead to conflicts of warrants. The approach Q applied follows RDA and the FRBR conceptual model. This approach emphasizes *Literary warrant* and *Resource warrant*, and specifically, the content of the rubbing (e.g., transcribe rubbing title). The approach Z took emphasized *User warrant* and *Resource warrant,* and specifically, the complex nature of the resource format: rubbing. After knowing both sides of the story, instead of judging which approach is "right," it boils down to the

cultures of different communities. Q's approach may serve the U.S. users and library communities well if there is a shared expectation of the transcription principle and the application of the FRBR model. Similarly, Z's approach would serve the Chinese rare books and special collections community well because users have shared assumptions with the catalogers and interpret the records accordingly. Confusions and misunderstandings occur when the embedded assumptions of the records differ from users' expectations. When catalogers create records and share with international users through union catalogs like WorldCat, discrepancies may occur.

One noteworthy observation is that providing scan images is a shared expectation in the CALIS community. When this cataloging project started, Z asked Q about the workflow of sending cataloged resources to other staff to create scan images, and Q was confused by this inquiry. This scenario highlights the cultures, that is, the assumptions shared among the members of a cultural group, of different cataloging communities. With the support of scan images, catalogers have the flexibility to provide value-added metadata (e.g., assigned title) and a mixture of original artwork metadata and the rubbing metadata. Users can access scan images for verification and clarification. Unlike the CALIS community, it is difficult to expect the wider library communities that adopt RDA and share records through WorldCat to provide resource scan images. The transcription principle was embedded in cataloging guidelines (e.g., AACR2) and widely practiced before the trend of resource digitization. As Q once said, "We transcribe. Like a camera." The different approaches and expectations about providing resource surrogates (i.e., scan images, information transcribed from resources) are manifestations of culture in the different cataloging communities.

Previous studies have discussed the issues of describing non-book materials in libraries. Gorman's (1990) "deformed book theory" describes how non-book resources are treated as if they were books in cataloging. When discussing bibliocentrism in library catalogs, Smiraglia (2009) mentioned "the cult of title page," which assumes all resources have a title page as an information source to transcribe from, and indicates that books are good, and non-books are bad. This is an example that aligns with the "deformed book theory." While there has been continual effort to address this issue and make RDA more applicable to diverse resource types, its predecessor, AACR2, has a strong Anglo-American focus. The FRBR model also works best in describing monographs. Describing rubbings with RDA is one case of applying book-oriented standards to non-book materials. Rubbing is not the only type of non-book material that does not "fit well" with the standards. Issues occur to music resources and serials as well. However, one noteworthy point about this scenario is the cultural influences in the concept of authorship. Author/creator is an important access point and a characteristic for arrangement in knowledge organization and information retrieval. As Lee (2018) argued, authorship is a culturally, socially, and temporally bound concept. Author information indicates *author function*, which is a complex mass of characteristics influenced by social, cultural, and temporal factors. Some examples are the style, value, and historical background of an author. The author information in cataloging records, however, often fails to capture the richness of authorship (Foucault, 1970; Lee, 2016; Martínez-Ávila et al., 2015; Moulaison et al., 2013, 2014; Smiraglia & Lee, 2012; Smiraglia et al., 2013). The cataloging scenario provides a real-world case to support this. Whether people treat stone carvers and technicians as creators differ by cultures and times.

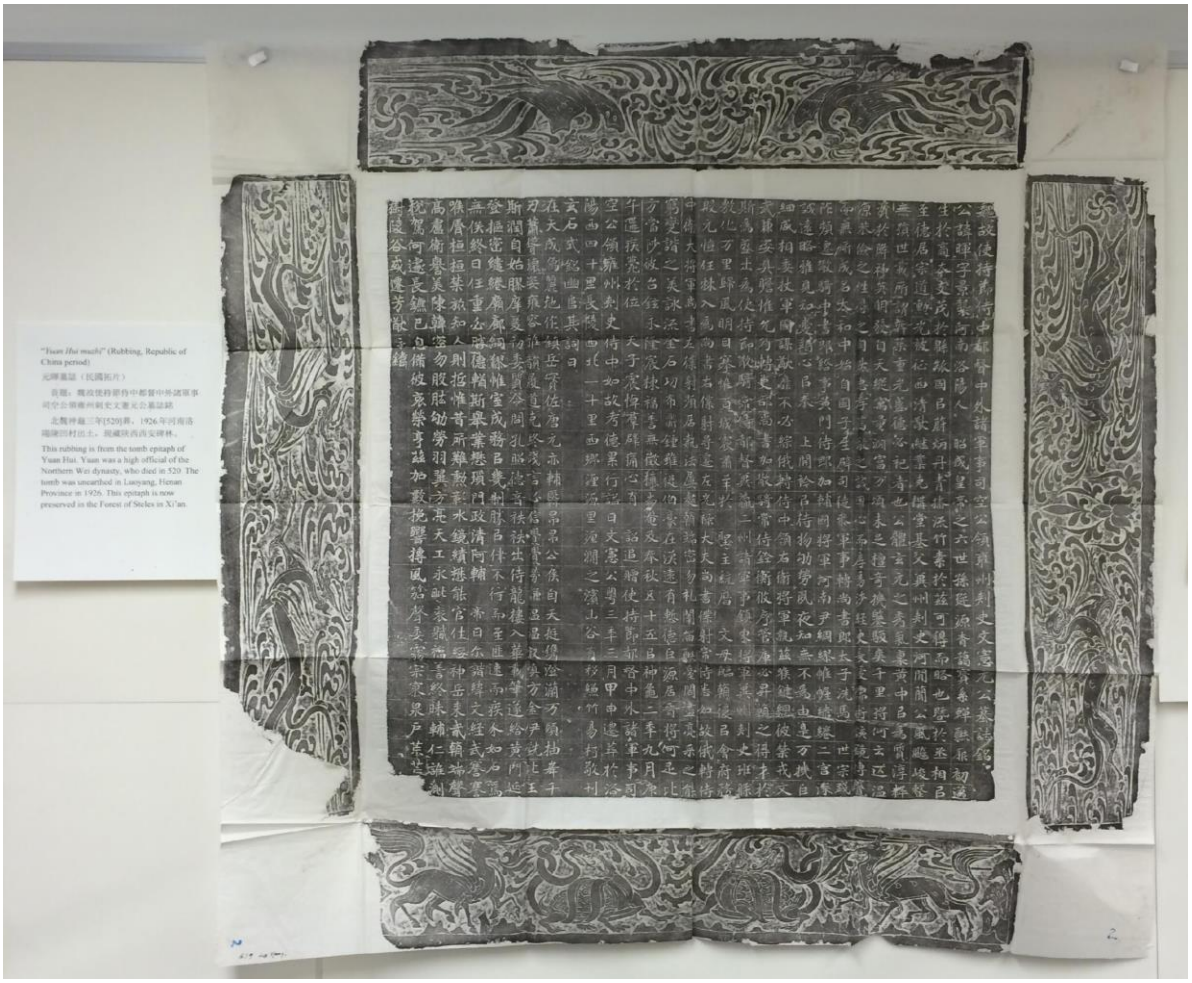


Figure 1. A Rubbing (1912-1949?) of an Epitaph (520).

Sichuanese, Sichuan ren, or...?: Literary Warrant vs. Literary Warrant

In one observation session, Q received a consultation request from a colleague, who contributed to the development of LCDGT (Library of Congress Demographic Group Terms) through proposing a variety of terms. The LCDGT is a controlled vocabulary for demographic groups. The Library of Congress started developing this vocabulary in 2013, and there have been constant updates since then. There are eleven categories of terms (i.e., age; educational level; ethnic/cultural; gender; language; medical, psychological, and disability; national/regional; occupation/field of activity; religion; sexual orientation; social) to describe the demography of creators, contributors, and intended audiences of resources (Library of Congress, 2020a). Catalogers can assign LCDGT

in both bibliographic records and authority records. With the development of another thesaurus – the Library of Congress Genre Form Terms (LCGFT), the goal is to separate both demographic terms (LCDGT) and genre/form terms (LCGFT) from subject headings (LCSH), which describe what a resource is about. Q's colleague wanted to propose a Chinese demographic group term, and asked Q for her advice on term choice and the selection of preferred form.

The term Q's colleague chose was *Sichuanese,* a term that refers to people in the Sichuan province in China. Two use case examples are: describing the census data of Sichuan, and describing a resource about Sichuan opera, which is a type of Chinese drama that originated from Sichuan. Since the preferred form of LCDGT should be in plural form, Q's colleague asked if Sichuanese is an appropriate and representative form for people in Sichuan. To answer this question, Q had to clarify that while there are different terms for a single *person* and multiple *people* in English, we can use the same term, "ren" (人), for both an individual and the people of an ethnicity group in Chinese. That is, the expressions "Wo shi Sichuan *ren*" (I am from Sichuan/I am Sichuanese)" and "Wo men shi Sichuan *ren*" (We are from Sichuan/We are Sichuanese) are both correct. The form "Sichuanese" is applicable to individuals and a group of people. However, Q reminded me that Sichuanese is an anglicized form. Instead of selecting Sichuanese, Q listed the Pinyin form, *Sichuan ren,* as the answer to the plural form for people in Sichuan.

To evaluate the appropriateness and representativeness of *Sichuan ren,* Q searched WorldCat records through OCLC Connexion, and saw many libraries hold books with Sichuanese as part of the titles. She also checked some Chinese databases. The term seemed to be widely used. However, when Q checked Wikipedia, the entry for people in Sichuan is "Bashu min xi (巴蜀民系)." Variant

forms include Sichuan ren (四川人), Chuan ren (川人. Chuan is the official abbreviation of Sichuan), Chuan Yu ren (川渝人), and Bashu ren (巴蜀人). This nudged Q to do more research about the similarities and differences between these terms. Q searched WorldCat records and saw many books, especially history books, only use *Bashu* and not *Sichuan*. *Sichua*n and its abbreviation *Chuan* are contemporary terms that refer to the Sichuan province. *Chuan Yu* is a combination of *Chuan* and *Yu*, and the latter is the abbreviation for Chongqing City. Sichuan province and Chongqing City are next to each other. Historically, *Bashu* refers to both Sichuan and Chongqing. Since regional boundaries change over time, *Bashu* can also refer to areas beyond Sichuan and Chongqing. The regions these variant terms refer to are not identical. Q compiled her findings into a response to her colleague. Q suggested using the term *Sichuan ren*, and list the variant forms and near synonyms with explanations of their similarities and differences. To propose the LCDGT, Q's colleague not only has to include a list of near synonyms as variant forms, but also has to do authority control for different Romanizations of *Sichuan*. At the time of writing, the preferred term for people in Sichuan is *Sichuanese*. Terms like *Bashu ren* and *Sichuan ren* are variant forms (Library of Congress, 2016).

Before the wide adoption of Unicode, the older cataloging systems only supported ASCII codes, thus could not display Chinese characters. As a result, Chinese records created at that time only have Romanized descriptions. Without intonation marks and consistent spacing, even native speakers may find the Romanized descriptions difficult to comprehend. Furthermore, there are different Romanization standards, which include Hanyu Pinyin (漢語拚音), Wade-Giles (韋氏拚音), and Tongyoung Pinyin (通用拚音). Hanyu Pinyin, or its common abbreviation, Pinyin, is a standard established and applied in China. It is adopted by many other countries and regions, like

Singapore. Wade-Giles was popular in Taiwan and Hong-Kong. It was the most frequently used Romanization standard in Western scholarship before 1979 (Krieger et al., 1997; Taiwan Government Information Office, 2002). Tongyoung Pinyin, also known as Taiwan Pinyin, was developed and used in Taiwan. One of the strengths of this standard is the ability to Romanize other local languages in Taiwan, such as Southern Fujianese and Hakka. It is also compatible with Pinyin (Taiwan Government Information Office, 2002). Many place names and people's names on official documents use Wade-Giles or Tongyoung Pinyin. Recognizing the issues of applying multiple Chinese Romanization standards, in 2002, the Library of Congress launched a Pinyin conversion project (Library of Congress, 2005). This project automatically converts Wade-Giles Romanization in the old records to Pinyin. However, the conversion is not perfect. For example, the character 的 can be pronounced as "de" or "di", depends on the context. Nation names, such as 中國 (China) should be one term without spacing, "Zhongguo," not "Zhong guo." These errors can only be fixed by catalogers manually. Having multiple Romanization systems makes information retrieval challenging. If a user wants to search about a topic comprehensively, they have to search multiple times, or use Boolean logic operators to connect all possible Romanizations. For example, to search for resources about China, it requires multiple searches of: Zhongguo, Zhong guo, Chung Kuo, or Chungkuo. Recognizing the issues and the need for international standardization, the Taiwan government started suggesting the adoption of Pinyin in 2009, while respecting personal choices of the Romanization of surnames and given names (Shih, 2008).

In this cataloging scenario, we see conflict between *Literary warrant* and *Literary warrant*. Depending on the body of literature referenced, the preferred term may differ. Q's colleague searched literature in English, and found the commonly used term *Sichuanese*. Consulting

literature in both English and Chinese, Q was able to identify more terms and the temporal contexts of older terms like *Bashu,* and suggested a non-anglicized term. Cultural influences are embedded in the historical and temporal context of terms (e.g., the boundaries of geographical regions). The selection of preferred terms, however, is also dependent on the intended users. While the LCDGT may be used internationally, like LCSH, it is developed by the Library of Congress to serve the Congress and U.S. libraries. This explains, at least partly, the choice of *Sichuanese* as the preferred term. This case highlights the differences between the culture of which a concept originated from and the culture of the majority of the intended users. In addition, we see the temporal, cultural, and political aspects of Chinese Romanization standards, and the consequences of changing standards.

After reviewing three cataloging scenarios, we see a common theme. The differences between cataloging communities lead to conflicts of warrants. These conflicts help unveil cultural influences in the knowledge organization process, which can become manifestations of cultural warrant when information professionals deliberately account for cultures. When we pair the observations from the scenarios with the *Knowledge Organization Process* codes in the codebook, we identify cultural influences throughout every step in the knowledge organization process. First, rubbing is an example that shows how *Resource* (B.5.) format can be cultural. The nature of this format highlights the complex relationships between a rubbing and at least two other relevant works: the original artwork and a stele. It also highlights how the concept of authorship and the idea of who deserves an authorship differ in different cultures. Second, there are multiple *Agents* (B.2.) in the knowledge organization process. We see different catalogers can shape resource descriptions through the cataloging communities they trust and their choices of reference sources. Also, standard developers like the Library of Congress can decide on the prioritization of warrants

when conflicts occur. The selection of the preferred form of controlled vocabularies like the LCDGT *Sichuanese* is one instance. The *Standards, Practices, and Principles* (B.6.) applied in the knowledge organization process are cultural as well. For instance, the estimation of the quality of a cataloging record, the prioritization of principles (e.g., transcription principle), the assumptions about the default resource type (e.g., deformed book theory and bibliocentrism), and the concept of authorship. In knowledge organization *Actions* (B.1.), besides recording information from resources, catalogers may have to consult reference sources to create resource descriptions. The choice of sources and the sources that a cataloger is able to access and comprehend are related to both *Actions* (B.1.) and *Agents* (B.2.). In resource *Descriptions* (B.3.), the choice of preferred form for the LCDGT *Sichuanese* showcases cultural influences in different bodies of literature, and the temporal aspect of terms. In the same scenario, we see the consequences of applying multiple Chinese Romanization standards, the cost of changing standards, as well as the global-local tension between adopting a more widely used standard (i.e., Pinyin) and using a local standard that better serves local needs (i.e., Tongyong Pinyin). These are examples of cultural influences in *Knowledge Organization Influences* (B.4.) in the knowledge organization process.

Prioritization

Besides the differences in the principles and beliefs in cataloging communities, bodies of literature, and rationales of knowledge organization standards, prioritization of competing warrants leads to another type of warrant conflict. In the fieldwork, I observed several cases of conflicts between warrants. Through examining the conflicts, I will identify and analyze cultural influences in the knowledge organization process in the following section.

Unit of Description for a Series: Resource warrant vs. Literary warrant and Philosophical warrant

In this cataloging scenario, Q reviewed the record of a Chinese rare book, which is one volume of a book series. The title in the record is 清代名人家書: 10 種 (Correspondences of 10 celebrities in the Qing dynasty). However, Q did not find this title in the book at hand. The caption title of the book[3] is 紀曉嵐家書 (Xiao Lan Ji's correspondence). Q inquired about the title source Z used, and knew that the title was not transcribed. It is a series title assigned by Z. Q searched the CALIS catalog and found a similar record that might describe the same series of books. This CALIS record shows that there are 10 volumes in this series, and Xiao Lan Ji is one of the 10 celebrities. The title was first recorded as 清代名人家書 (Correspondences of celebrities in the Qing dynasty). It was updated to 十大名家家書 (Correspondences of 10 celebrities), which was transcribed from the title page of the last volume of this series. From the scopes of the four titles, there are three series titles and one volume title. Q explained that catalogers can choose the unit of description for series. If described by series, a cataloger would create one record to cover all the volumes in a series. The title information would be the series title, and volume titles would be recorded in the note field or listed as added entries. Added entries provide additional access points to related names or titles (Library of Congress, 2017b) If described by volume, a cataloger would create a record for every volume. The title information would be volume title. In this case, Q decided to describe the series by volume, because the library only had one volume of this 10-volume series, and there may not

[3] In CGCRB (Cataloging Guidelines for Creating Chinese Rare Book Records in Machine-Readable Form), the cataloging guideline for Chinese rare books applied in the cataloging project I observed in the field, there is a ranked list of title sources. Catalogers are instructed to record title information by following the recommended order of title sources on this list. The title sources are caption (i.e., the first page of the content 卷端), end title (尾題), compilation principles (凡例), table of contents (目錄), preface (序), postscript (跋), center column (版心), inner cover (內封面), original printed titled label (原印書籤), and printer's colophon (牌記).

be enough information in the volume to describe the entire series. For instance, Q could not verify and transcribe the series title because the last volume was not in the library collection. However, Z preferred to describe by series. In the end, the record shared through the CALIS catalog was described by series, and the record shared through WorldCat was described by volume.

In this scenario, catalogers have two sanctioned options of unit of description. Q's approach emphasizes *Literary warrant*, the collection of the local library, and *Philosophical warrant*, the transcription principle. The decision was dependent on whether there was enough information for transcription from the accessible local collection. Z's approach prioritizes *Resource warrant*, the relationships between the resource at hand and relevant resources. Instead of limiting the description to local collection, this approach provides a holistic view of this one volume by highlighting its whole-part relationship with the series. The first approach prioritizes a clear expectation of accessible resources, the connection to local collections, and a description based on resource self-representation. The second approach prioritizes presenting relationships between a series and its volumes, based on both resource self-representation and referencing other sources. In this case, whether the culture of a cataloging community emphasizes transcription principle would influence a cataloger's decision.

Disagreements and Changes: Philosophical warrant, Resource warrant, and Standard warrant

In the cataloging process, catalogers often start with bibliographic verification, searching the local catalog for duplicate records to prevent redundant work, and searching WorldCat to copy records of the same resource or modify records of similar resources. Through bibliographic verification, catalogers can reference colleagues' decisions, especially on subject descriptions (e.g., class number and subject headings), and follow or modify the decisions in the record. In the fieldwork,

I observed several instances of this process, which aligns with the subject description process depicted in Šauperi and Saye (1998). Examining these examples, particularly the cases of disagreements and modifications, can help us identify the underlying warrants that support catalogers' decisions. The following section presents a selection of three scenarios in which philosophical warrant, resource warrant, and standard warrant compete with one another. We can observe cultural influences in the prioritization of different warrants.

The first scenario is an example of which *Philosophical warrant* (systematic arrangement) and *Literary warrant* (collection warrant) was prioritized over *Standard warrant*. The resource at hand is a book titled *Pei wen shi yun shi yao: wu juan* (佩文詩韻釋要: 五卷). It is a 5-volumed added commentary of *Pei wen shi yun* (佩文詩韻). This commentary was written by Zhaoji Zhou (周兆基), and the author of the *Pei wen shi yun* is Yushu Zhang (張玉書). When creating the record for the commentary, Q searched WorldCat and reviewed the record of the commented work *Pei wen shi yun* to get a better idea of what the commentary was about. The class number for the commented work is PL1279.C56. The number C56 is the Cutter number for the author, but in the old Romanization form: Yushu Chang. Due to the change of the dominant Romanization system, what used to be Chang is now Zhang, which would use a different Cutter number. Q checked the local catalog and saw C56 was assigned to the record of the commented work. Q had two options when assigning the class number to the commentary. One choice is to prioritize *Standard warrant* and assign a different Cutter number by applying the Pinyin system. The other choice is to prioritize *Philosophical warrant* (systematic arrangement) and *Literary warrant* (collection warrant), and assign C56, so this book can collocate with existing collections that are about the same work. In this case, Q decided to assign C56, the number that is based on the old Romanization

system, to prioritize the collocation objective of the library catalog. The decision originated from the change of Romanization systems, which has its cultural, temporal, and political aspects, as mentioned above. It requires awareness of these factors for a cataloger to make a well-informed decision.

The second scenario showcases how the *Resource warrant* was prioritized over *Philosophical warrant*. The resource is titled *Zhuang hui tang wen ji: shi juan* (壯悔堂文集: 十卷). It is a collection of essays written by Fangyu Hou (侯方域), who named his study as *Zhuang hui tang* (壯悔堂). There were already two editions of this work in the local catalog, but the book at hand was an older edition. It was published between 1656 and 1735. The two other editions were both classed under DS (History of Asia). However, only some essays in this book are about history. Considering the subject matter of the essays in this collection differ, Q decided to classify all three editions under class PL2710 (Languages of Eastern Asia, Africa, Oceania > Chinese language and literature > Individual authors and works). The classification decision prioritizes *Resource warrant*, the resource format and genre (essay collection), and the author of this collection. To maintain systematic arrangement (*Philosophical warrant*) and consistent application of knowledge organization standards (*Standardization warrant*), Q not only classified the book at hand under class PL, but also reclassified the other two editions. The decision was based on the understanding of the essay content and genre. It requires familiarity with the Chinese culture, such as the ability to comprehend classic Chinese, to make this decision.

The third scenario is an example of prioritizing *Resource warrant* over *Philosophical warrant*. In this scenario, Q reviewed a record of a script of Nō, which is also known as Nō (Noh) play. It is a

form of classical Japanese musical drama. One of the revisions Q did was removing a LCSH "Musicals." The scope note of *Musicals* provides its definition, "This heading is assigned to music for theatrical productions consisting of musical numbers (songs, ensembles, and dances) integrated into a dramatic framework. Music for theatrical productions featuring a series of songs, dances, and other entertainments without any unifying dramatic element is entered under [Revues.]" (Library of Congress, 2009). The broader term for *Musicals* is *Dramatic Music*, which has other narrower terms like Operas, Librettos, Revues, and Ballets. Instead of using *Musicals*, the heading *Nō plays* can more accurately describe this resource. Catalogers are instructed to assign this heading to "the texts of the Nō plays and works treating of them from a literary point of view. General works and those that deal solely with the presentation of Nō plays on the stage are entered under [Nō.]" (Library of Congress, 1986). The broader term of *Nō plays* is *Japanese drama*, which has other narrower terms like *Kabuki plays* and *Kyōgen plays*. Without familiarity with the Japanese culture, a cataloger may take the description of Nō, "classical Japanese *musical drama*," on the surface, and assign *Musicals* to describe the resource. The decision to change the subject description prioritizes *Resource warrant* (format/genre) and *Accuracy warrant* over *Philosophical warrant* (systematic arrangement). Faithful description and representation of a cultural genre/form is prioritized over following the cataloging decisions in existing records.

Workaround: Standard warrant and Interoperability warrant vs. Accuracy warrant, Literary warrant, and Philosophical warrant

This cataloging scenario presents the observed workarounds of a display issue of non-Roman characters. The resource is a Chinese rare book titled Zhou qing yi wen: er juan (籀高遺文: 二卷. The Essays of Zhou Qing: Two volumes). Through some research, Q verified that Zhou qing (籀

㒳) is the pseudonym/art name (號, hao) of the author, Yirang Sun (孫詒讓). After bibliographic verification, Q found some records of this work in WorldCat. However, the two Chinese characters are so rarely used that errors and display issues occured. One record used 膏 (gao) for 㒳 (qing). The two characters look alike, so this may be a typo. Some records, however, used 頃 (qing) for 㒳 (qing). After consulting Chinese dictionary and some testing of the system, Q realized that 頃 and 㒳 are synonyms. Also, Q knew that MARC 8, which is the character encoding standard used in MARC 21 records, uses a limited (8-bit) character set. It only supports the display of 頃 and not 㒳. This explains the cataloging decisions of some records in WorldCat.

The Library of Congress (2007) instructs that "implementations that require characters beyond this [MARC 8] repertoire should consider using the Unicode encoding instead of MARC-8." However, MARC 21 is an international standard for representing and sharing bibliographic, authority, holdings, classification, and community information data (Library of Congress, 2008). Libraries that use and share information based on the MARC 21 standard are of variant scales and levels of human resources and budget. As Q explained, not all library systems support Unicode encoding. In order to apply a sanctioned encoding standard and ensure information sharing with other libraries, many libraries use MARC 8 even if their systems support Unicode encoding. Using a synonym to replace a character with display issue is a workaround for the technical limitations of MARC 8. While this is a clever workaround, it requires catalogers' awareness of the limitations of MARC 8, and Chinese language skill to select a synonym for a rarely used term. The workaround fails to accurately transcribe the resource title, which is a key access point for information retrieval. In this case, *Accuracy warrant*, *Literary warrant*, and *Philosophical warrant* (*Access warrant*) were compromised for *Standard warrant* and *Interoperability warrant*.

In the above scenarios, we can identify cultural influences in different stages of the knowledge organization process through examining the prioritization of warrants. In the first scenario, the cultures of different cataloging communities influence catalogers' decisions on the unit of description for series. This shapes the emphasized aspects of a resource description (B.3. *Descriptions*), and the prioritized objectives and values. In the second scenario, cultural influences factored in the context of Chinese Romanization systems (B.6. *Standards, Practices, and Principles*). Understanding of the cultural, social, and temporal context of knowledge organization standards can shape cataloging decisions. The third, the fourth, and the fifth scenario highlight the importance of catalogers' cultural expertise (B.2. *Agents*). To provide faithful and accurate resource descriptions, knowledge about the cultural context of resources (B.5. *Resources*) is critical, particularly for cultural objects or culturally specific genres/forms. Culture influences catalogers' ability to come up with and implement workarounds (B.1. *Actions*), which shapes resource descriptions (B.3. *Descriptions*) and lead to consequences (B.4. *Knowledge Organization Influences*), such as successful information retrieval. Reflecting on the observed cataloging traditions, we see cataloging decisions that prioritize transcription, which emphasizes clear distinction between transcribed information and other information through adding brackets. There are also decisions that prioritize value-added descriptions, such as assigned titles for rubbings. These descriptions often require catalogers' subject expertise. In both traditions, we observe the importance of catalogers' cultural expertise. Cultural expertise may take many forms. It can be language skills, familiarity with a particular genre/form, or the knowledge about the context of a resource or the context of a relevant knowledge organization standard.

In this chapter, we take a close look at the conflict and prioritizations between warrants in cataloging scenarios. It allows us to identify warrants and observe relationships between warrants. In previous studies, Bullard (2017) discussed two types of relationships between warrants, which are (1) a secondary warrant augments the primary warrant, and (2) a secondary warrant overturns a decision based on the primary warrant. In the cataloging scenarios, we see both types of relationships. Through applying a broader sense of *warrant*, from classificatory decisions to knowledge organization decisions, we gain more depth to advance our understanding about the relationships between warrants. For the first type of relationship, we see examples in several scenarios, in which the conflict and prioritization happened between two *sets* of warrants. Take the last scenario about workaround as an example, *Standard warrant* and *Interoperability warrant* augment each other, and both are prioritized over *Accuracy warrant*, *Literary warrant*, and *Philosophical warrant*. One thing to note is that in real world cases, there are often multiple competing warrants. While we may be able to identify the prioritized set of warrants, it is not always clear which warrant is the primary one and which ones are not. For the second type of relationship, the observed scenarios capture other factors and complexities. When warrants conflict, it may lead to the creation of different resource descriptions. For example, Q and Z created records for the same rubbing, and shared the records through WorldCat and CALIS respectively. The two records prioritize different warrants. Conflict of warrants may also lead to a change of warrant prioritization. In this case, a decision may be overturned, but decisions may be supported by more than one warrant.

The examination of conflicts and prioritization of warrants often traces back to the reasons of these conflicts, and leads to the purposes, principles, and values of resource description. Besides these observations, we can see how the same warrant may be applied differently, and even result in conflicting practices. For instance, in the second scenario about rubbings, we see *User warrant* and *Resource warrant* (Format) conflict with *Literary warrant* and *Resource warrant* (Content). In this case, we see the multi-aspect characteristic of *Resource warrant.* Prioritizing different aspects of the same warrant may lead to different approaches of resource description. The third scenario about the LCDGT *Sichuanese* is an instance of *Literary warrant* vs. *Literary warrant*. Depending on the body of literature selected (e.g., literature in English, literature in Chinese), two catalogers can both prioritize literary warrant, but make different resource description decisions (e.g., Sichuanese, Sichuan ren). Similarly, both Q and Z take users into account when they describe rubbings. However, the intended users differ, and so are the assumptions shared between those users and the catalogers (e.g., transcription, value-added metadata and scan images of resources). While both cataloging traditions value *User warrant*, the differences in users support different resource descriptions. The cases of the same warrant applied through different practices shed light on the role of culture in the knowledge organization process. Since warrants are sources of justification for classificatory decisions, or in a broader sense, knowledge organization decisions, the scopes of warrants are general (e.g., literary warrant does not specify a body of literature, user warrant does not specify a particular user community). Identifying any cultural aspect of a warrant is helpful in narrowing down the scope of a warrant in a particular context. Treating cultural influence as a qualifier for warrants allows us to be more specific when discussing warrants and the relationships between warrants.

5. Levels of Standards and Standardization

Through analyzing the three knowledge organization standards and cataloging practices in the field, I observe multiple standards and levels of standardization shape resource descriptions. In order to trace the sources of cultural influences in the knowledge organization process, we need to go beyond examining the resource descriptions, and identify the cultural influences embedded in each standard and standardization. In this chapter, I will first introduce the standards each of the three knowledge organization standards are based on, and discuss how we can identify sources of cultural influences through this activity. Subsequently, I will present a selection of cataloging scenarios observed in the field. Through the scenarios, I will introduce the variant knowledge organization standards applied, and the levels of standardization (e.g., consortiums) identified in the cataloging process. Following these two sections, I will elaborate on two topics in cataloging practices, which are: (1) knowledge organization standards being cultural, and (2) conflicts of standards, principles, and practices. Since standards can be cultural in different ways, applying multiple standards and conforming to different levels of standardization lead to complex cultural influences in the knowledge organization process. Studying the cases and unpacking the sources of cultural influences can help us operationalize cultural warrant in knowledge organization. To better capture and discuss the levels of standards and standardization, I propose a working categorization, and I will apply it to the following sections. The working categories of standards and standardization is:

- Institutional level (e.g., UW Libraries)
- Community level (e.g., East Asia Libraries in the U.S.)
- National level (e.g., U.S. libraries)
- International level (e.g., libraries that use RDA)

- Network level (e.g., SUMMIT consortium, PCC (Program for Collaborative Cataloging) members[4])

The first four categories, institutional level, community level, national level, and international level, are categories by scale. The fifth category, network level, is not part of the *scale family*. It refers to library networks and consortiums that may be of variant sizes, and the members of a network can be local or international.

The Installed Bases of Knowledge Organization Standards

As Bowker and Star (2000) point out, infrastructures are built on installed bases. Classification, as a type of infrastructure, is no exception. This section, I will unpack the different types of standards that serve as the foundation of the three knowledge organization standards: CCL, NDC, and RDA.

According to Liu's words and Lee's *Preface* in Liu (1929), CCL (the New Classification Scheme for Chinese Libraries) was built on several types of standards. At the time, CCL was expected to complement the existing card catalogs and naming conventions. For classes that exist in traditional Chinese bibliographic classifications or catalogs, Liu referenced those standards. Specifically, he referenced the classes and class names of the bibliographical section in the *Book of Han* (*Hanshu yiwen zhi.* 漢書 藝文志). The *Book of Han* (*Hanshu.* 漢書) records the history of the former Han (or Western Han) dynasty (206 BCE to 23 CE). It is compiled by the lead author Ban, Gu. *Yiwen*

[4] The PCC (Program for Collaborative Cataloging) is an international collaborative cataloging network. There are four programs of the PCC: BIBCO (monographic bibliographic record cooperative program), CONSER (cooperative online serials program), NACO (name authority cooperative program), and SACO (subject authority cooperative program). Institutional members participate through training, reviewing records, and creating and sharing bibliographic and authority records using the PCC guidelines (Library of Congress, 2021).

zhi (藝文誌) or *the Treatise on Literature*, is the bibliographic section. This section includes six Domains (略), which are the Confucians (六藝略), the Philosophers (諸子略), Shi and Fu Poets (詩賦略), the Militarists (兵書略), Astrologers and Diviners (術數略), and Herbalists and Alchemists (方技略). Liu also adopted the classificatory decision in the bibliographical section in the *Book of Sui* (*Suishu jingji zhi*. 隋書 經籍志) to distinguish the Philosophy class from Buddhism and Taoism. The *Book of Sui* is the official history of the Sui dynasty (581-619). It was written by a group of scholars led by Zheng Wei. In the bibliographical section, we can observe a mix of top-down and bottom-up classification. One example is the "unicorn classes*"* of Taoism and Buddhism. These two classes are listed in the appendix, but there is no book listed under either of the classes. This top-down approach, which saves spaces in the scheme for the not yet existing collections, is different from the collection based, bottom-up approach in other classes of this classification (Cheng & Chen, 2016). Liu was also influenced by the bibliographical section in the *Comprehensive Treatises* (Tongzhi yiwen lue. 通志 藝文略), the bibliographical chapter in the *Comprehensive Investigations based on Literary and Documentary Sources* (Wenxian tongkao jingji dian. 文獻通考 經籍典), the *Bibliographic Treatise* of the *Dynastic History [of the Ming]* (Guoshi jingji zhi. 國史 經籍志), the *Complete Library in Four Sections* (Siku quanshu. 四庫全書), and the *Answers to the Inquiries into Bibliography* (Shumu dawen. 書目答問). The *Comprehensive Treatises* (Tongzhi. 通志) was published in 1161. It records the general Chinese history that spans across all dynasties until the author, Zheng, Qiao's time in the Song dynasty. The 200 scrolls include biographies, time tables, and 20 treatises (lue. 略). The 20 treatises provide an overview of variant topics, including the capital cities and local administration (Du yi lue. 都邑略), plants and animals (Kun chong cao mu lue. 昆蟲草木略), written literature (Yi wen lue. 藝

文略), illustrated books (Tu pu lue. 圖譜略), and bronze and stone inscriptions (Jin shi lue. 金石略). The bibliographic section (i.e., Yi wen lue. 藝文略) is divided into 12 categories with up to two levels of division by the content and use of a book (Theobald, 2019b). The *Comprehensive Investigations based on Literary and Documentary Sources* (文獻通考) is a general administrative history from antiquity to the Jiading reign period (1208-1224) in the South Song dynasty. It was written by Ma, Duanlin during the Yuan dynasty (1279-1368). The bibliographical chapter (Jingji dian. 經籍典) is one of the 24 investigated categories (Theobald, 2010b). *The Dynastic History* (Guoshi. 國史) is the dynastic history of the Ming dynasty (1368-1644). It was compiled by Jiao, Hong, and only the bibliographic chapter (Jingji zhi. 經籍志) was finished. The chapter was divided into Classics (Jing. 經), Histories (Shi. 史), Masters (Zhi. 子), and Collections (Ji. 集), and each category was further subdivided (Theobald, 2019a). The *Complete Library in Four Sections* (Siku quanshu. 四庫全書) is the largest collection of books in the Chinese history. A group of scholars followed the Qianlong Emperor's order and compiled this work from 1773 to 1792. Its catalog is divided into four categories: Classics (Jing. 經), Histories (Shi. 史), Masters (Zhi. 子), and Collections (Ji. 集), and subdivisions (Theobald, 2010a). *Answers to the Inquiries into Bibliography* (Shumu dawen. 書目答問) is a catalog compiled by Zhang, Zhi-Dong (張之洞) in 1876. The catalog includes translated books, and classifies books into five categories: Classics (Jing. 經), Histories (Shi. 史), Masters (Zhi. 子), and Collections (Ji. 集), and Series (Congshu. 叢書) (Zhang, 1876).

For the new and translated knowledge, Liu referenced Western standards. The standards he consulted were the Library of Congress Classification (LCC), Dewey Decimal Classification

(DDC), which was at its 12th edition, Cutter's Expansive Classification (EC), and Brown's Subject Classification (SC). Besides Western standards, Liu also referenced contemporary (around 1920s) Chinese standards. There were general classification schemes like the *Universal Classification* by Doo, Dingyou (杜氏圖書分類法) and the *Bibliography of the Mengfang Library* (孟芳圖書館書目). Mengfang Library is in the Southeast University in China. Liu also consulted specialized classifications like the *Bibliography of Epigraphy* (*Jinshi Shumu.* 金石書目) by Huang, Liyou.

Liu referenced the class names, categories, and classification structures of the above-mentioned standards, which span from 206 BCE to 1920s. The rationales of the categories and structures are value embedded. We can observe the evolution of the highlighted values through tracing the classes or categories of the standards, especially the traditional Chinese standards. For instance, in the *Book of Sui*, the editors considered Buddhism and Taoism distinct and important enough to be separated from the Philosophy class, even if the decision was not collection based. Liu adopted this decision in CCL. Also, we see the four categories: Classics, Histories, Masters, and Collections, in *The Dynastic History* (1590), the *Complete Library in Four Sections* (1792), and *Answers to the Inquiries into Bibliography* (1876). In these standards, the Confucius classics are collocated in the *Classics* (Jing. 經), which is emphasized as the first category. The prolonged application of these four categories influenced the design of CCL. Although Liu deliberately designed CCL as a discipline-based scheme to better serve the Chinese academic community at the time, and departed from the format-based categorization like the *Complete Library in Four Sections*, Liu still recognized the importance of the four categories. Liu wrote a section in the *Introduction* of CCL, explaining where the content of the four categories is in the scheme. The design of CCL was based on variant standards: Chinese and Western, traditional and contemporary, general and specialized.

They are sources of cultural influences that shape the CCL. The main classes of CCL and the 12th edition of DDC are listed in Table 3. There were no English class names in the CCL (1929) at the time. The English class names in the table were referenced from the 2001 edition of CCL.

DDC (12th ed.) (1927)	**CCL (1929)**
000 General works	000 Generalities 總部(叢書羣經皆屬此)
100 Philosophy	100 Philosophy 哲學部
200 Religion	200 Religions 宗教部
300 Social sciences	300 Natural Sciences 自然科學部
400 Philology	400 Applied Sciences 應用科學部
500 Pure science	500 Social Sciences 社會科學部
600 Useful arts	600 History and Geography 史地部
700 Fine arts	--
800 Literature	800 Language and Literature 語文部
900 History	900 Arts 美術部

Table 3. The Main Classes of DDC and CCL.

NDC was based on Western classifications and works, contemporary (around 1920) Chinese classifications, and contemporary Japanese classifications and works. According to Mori (1929), he was aware of the major Western classifications at the time, including the Dewey Decimal Classification (DDC), the Library of Congress Classification, Brown's Subject Classification, and Cutter's Expansive Classification (EC). One of the motivations of developing NDC is the "superficial imitations of DDC" Mori saw in other Japanese classifications at the time. Seeing the flaws in other schemes, one of the objectives of developing NDC is to establish a local scheme that realizes the true spirit of DDC, which was at its 12th edition. Mori imitated the structure of DDC, but referenced the sequence of the main classes in Cutter's EC, because its "arrangement is said to be the most theoretical." Based on EC, Mori further tailored the main classes to fit the Japanese and Chinese collections and applied the decimal notations. The following table shows the main classes in DDC, NDC, and EC.

DDC (12th ed.) (1927)	**NDC (1929)**	**EC (1891-93)**
000 General works	000 General works	A General works
100 Philosophy	100 Philosophy and religion	B Philosophy and religion
200 Religion	200 Historical sciences	E Historical sciences
300 Social sciences	300 Social sciences	H Social sciences
400 Philology	400 Natural science	L Science and arts (both useful and fine)
500 Pure science	500 Technology	
600 Useful arts	600 Productive arts	
700 Fine arts	700 Fine arts	
800 Literature	800 Language	X Language
900 History	900 Literature	Y Literature

Table 4. The Main Classes of DDC, NDC, and EC.

For adaptation and localization suggestions, Mori referenced Western works, Japanese works, and contemporary Chinese classifications. Mori mentioned taking William Alanson Border's and Dorkas Fellow's advice, which was translated and published in the first volume of the *Toshokan Kenkyu* (圖研究: 青年圖書館員聯盟機關誌) journal in 1928. The advice was to add Roman characters in front of decimal notations for localized use. This approach can avoid destructing the classification and notation structure while meeting the local needs. In the same volume of the *Toshokan Kenkyu*, there was a proposal of a localized book number standard that imitated the Cutter table. Mori explained that in Japan, traditionally, books were organized by shelving numbers. That is, books of the same subject were arranged by accession number. To add more structure to resource arrangement and meaningfully distinguish books about the same subject, we can apply standards like the Cutter table. Following the instructions in the Cutter table, we can generate a Cutter number using the first few letters of an author's last name (Library of Congress, 2020e). Cutter number is added behind the class number, and becomes a part of the call number. Mori addressed excitement to the development of a localized book number standard, like the Cutter number, for Japanese libraries. Besides Western works and Japanese works, Mori referenced contemporary Chinese classifications, because "Japan and the neighboring Republic of China

[1912-1949] have much in common," and many shared issues were studied by Chinese scholars. Mori named several scholars and their works: S. T. Y. Seng [Zurong Shen] (沈祖榮), You Fung Hung's [Youfung Hung] (洪有豐) *Library Organization and Management* (1926), Tienhong Bokui Chen's (1926) (陳天鴻柏逵) *Consistent & Practical Library Classification for Chinese and Foreign Books* (中外一貫實用圖書分類法), Ding U. Doo's [Dingyou Doo] (杜定友) *Universal Classification* (圖書分類法) (1925), and W. Y. Wong's [Yunwu Wang] (王雲五) *System for the Uniform Classification of Chinese and Foreign Books* (中外圖書統一分類法) (1928). Among these works, Mori specifically highlighted Doo's scheme and Wang's scheme. Doo's *Universal Classification* imitates the class arrangement of DDC. Mori thought highly of it and considered it fully realized the structural features of DDC. The *System for the Uniform Classification of Chinese and Foreign Books* was created to classify both Chinese and foreign books with one scheme. This scheme adopts most of the structure, main classes, and subclasses of the established and commonly used DDC. It also includes Chinese and English class names and indexes, and arranges the Chinese index using the Four Corner codes. To mix shelve Chinese and foreign books and cater to local needs, three symbols: 十, 廿, 土, were added to expand the decimal notations without undermining the structure.[5] Adding these symbols can prioritize particular resources (e.g., resources that are

[5] When 十 is added before a class number, it should be placed before the identical DDC number. For example, 十 323.1 is placed before 323.1. When 廿 is added before a class number, despite the digit in ones, place it before those with the same digit in tens. For example, 廿 110 Chinese philosophy and 廿 111 I Ching (Classic of Changes) are placed before 110 Metaphysics and 111 Ontology. When 土 is added before a class number, despite whether there is decimal, or the value of the decimal numbers, place it before those with the same digit in ones. For example, place 土 327 Diplomacy of China, 土 327.1 Diplomacy of China and the U.S., and 土 327.2 Diplomacy of China and Japan before 327 Diplomacy and 327.4 Diplomacy of Europe.

about, or relevant to, China or Japan in the history class and the literature class), while maintaining systematic arrangement. For example: 210 Natural theology. 廿 220 Buddhism and Buddhist sutras. 220 Christianity. In this case, since Buddhism is relatively popular in China and Japan, through adding 廿 to *Buddhism and Buddhist sutras*, the classificationist can adjust the class sequence and prioritize subjects that are more relevant to the local communities (National Central Library, 2018). The main classes of the *Universal Classification* and the *System for the Uniform Classification of Chinese and Foreign Books* are in Table 5. After publishing the first edition of NDC, Mori planned to adapt Dewey's Code for Classifiers as guidelines to help practitioners apply the scheme.

Doo's *Universal Classification* (1925)	**DDC (12th ed.)**	**Wang's *System for the Uniform Classification of Chinese and Foreign Books* (1928)**
000 General works	000 General works	000 General works
100 Philosophical sciences	100 Philosophy	100 Philosophy
200 Educational sciences	200 Religion	200 Religion
300 Social sciences	300 Social sciences	300 Social science[s]
400 Fine arts	400 Philology	400 Philology
500 Natural science	500 Pure science	500 Natural science[s]
600 Applied sciences	600 Useful arts	600 Applied science[s]
700 Philology	700 Fine arts	700 Fine arts
800 Literature	800 Literature	800 Literature
900 History and Geography	900 History	900 History and Geography

Table 5. The Main Classes of the *Universal Classification*, DDC, and the *System for the Uniform Classification of Chinese and Foreign Books*

Upon reviewing the editorial document of the first edition of NDC, we can identify several sources of standards that served as the foundation of NDC. The Western standards (e.g., DDC and EC) were referenced as models to adapt from. Mori reviewed and critiqued contemporary Japanese schemes and works to set the goals of NDC and identify particular aspects that should be addressed (e.g., the goal to realize the true spirit of DDC rather than superficial imitations). Interestingly, in addressing the foreseeable global-local tension in localizing DDC and developing NDC, Mori

referenced the contemporary Chinese schemes and works. This decision highlights how the Japanese and Chinese library communities share a similar stance in developing a localized scheme that aligns with the general practices of the international library communities. Cultural influences were embedded in the classification structures (e.g., discipline based), the adaptation approaches (e.g., adding symbols to decimal notations), and localization decisions (e.g., prioritize particular classes) in these "installed bases" of NDC.

Based on IFLA's *Statement of International Cataloguing Principles* (2009, 2016) and its *Strategic Plan 2005-2009,* RDA was based on international cataloging traditions and guidelines, conceptual models, and established principles. As the successor of AACR2, RDA is a widely adopted cataloging guideline with legacy impact. That is, a strong focus on the Anglo-American practices. In order to make RDA applicable to the international library communities, the Joint Steering Committee (JSC) has placed increasing emphasis on accounting for different user groups. In the previous chapter, we examined the objectives of RDA, and discussed the emphasis on the "convenience of the users" (IFLA, 2009) and the priority of *User warrant* and *Interoperability warrant* among other warrants (IFLA, 2016).

RDA is based on a set of conceptual models: the IFLA Functional Requirements Family, which consists of FRBR (Functional Requirements for Bibliographic Records), FRAD (Functional Requirements for Authority Data), and FRSAD (Functional Requirements for Subject Authority Data). At the time of writing, the JSC has been working on implementing the RDA Toolkit Restructure and Redesign (3R) project and replacing the IFLA Functional Requirements Family with the IFLA Library Reference Model (LRM). Based on LRM, the JSC aims to design RDA

Toolkits to serve the international, cultural heritage, and linked data communities (RDA Steering Committee, 2017). The FRBR model was the work of the IFLA Study Group on the Functional Requirements for Bibliographic Records working group, and published in 1998. The two primary purposes are to "provide a clearly defined, structured framework for relating the data that are recorded in bibliographic records to the needs of the users of those records," and to "recommend a basic level of functionality for records created by national bibliographic agencies." Specifically, FRBR provides a framework for understanding how bibliographic information serves the objectives of finding, identifying, selecting, and obtaining resources (IFLA Study Group on FRBR, 1998). There are three groups of entities in FRBR. The Group 1 entities are "the products of intellectual or artistic endeavours that are named or described in bibliographic records," which includes work, expression, manifestation, and item. The Group 2 entities are "those responsible for the intellectual or artistic content, the physical production and dissemination, or the custodianship of the Group 1 entities." The entities are person, corporate body, and family. The Group 3 entities "represent an additional set of entities that serve as the subjects of works." They are concept, object, event, and place (IFLA Study Group on FRBR, 1998). The three groups of entities cover the resource of description, the agents that create or contribute to the resource, and the subject matter of the resource. While the FRBR model lays out the three groups of entities, it focuses more on the Group 1 entities. In 2009 the IFLA Working Group on Functional Requirements and Numbering of Authority records (FRANAR) published the FRAD to complement FRBR. The purposes of FRAD are to provide a framework for relating the authority data to users' needs, and to assess the international sharing and use of authority data (IFLA Working Group on FRANAR, 2009). In 2011, the IFLA Working Group on the Functional Requirements for Subject Authority Records (FRSAR) published FRSAD to complement FRBR

and FRAD. It focuses on addressing subject authority issues and investigating users of subject authority data (IFLA Working Group on FRSAR, 2011). While all three standards are entity-relationship models, they were developed by different working groups from different perspectives. Over time, information professionals identified inconsistencies between the three standards. For instance, there are different definitions of a common concept, different levels of granularity, and different solutions for a common issue (Oliver, 2018). To address the need to consolidate the three models, the Consolidation Editorial Group of the IFLA FRBR Review Group (Consolidation Editorial Group of the IFLA FRBR Review Group, 2017) started working on combining the three models into one coherent model, LRM.

Besides cataloging practices and conceptual models, RDA is based on established principles, including the *Statement of Principles* (i.e., the Paris Principles), the *Statement on Open Access*, and the IFLA *Code of Ethics for Librarians and other Information Workers*. The *Statement of Principles* (International Conference on Cataloguing Principles, 1961) was adopted by the International Conference on Cataloguing Principles in Paris. It covers the functions and structure of library catalog, and the choice and form of headings and entries (e.g., author names, titles) for printed books and book-like materials in libraries. Since then, it influences cataloging standards and practices at an international level. In 2009, in response to the online environment, IFLA published an updated Statement of international Cataloguing Principles. This updated version is built on the FRBR conceptual model. It expands the applicable resource types and access points, and provides both general principles and specific rules that should be included in international cataloging guidelines. In 2016, an updated version was published to account for more user groups, the open access environment, interoperability and accessibility needs, search features, and changes

of user behaviors (IFLA Cataloguing Section and IFLA Meetings of Experts on an International Cataloguing Code, 2016).

As referenced in the *Statement of International Cataloguing Principles* (2016), IFLA's *Statement on Open Access* (2011) is one of the fundamental principles adopted by RDA. Recognizing the importance of universal and equitable access to information, and its influence on social, educational, cultural, democratic, and economic activities, IFLA President's Working Group for Open Access published a statement to support free access and reuse of scientific knowledge in variant formats, and emphasized on addressing access issues. The *Statement of International Cataloguing Principles* (2016) also referenced the *Code of Ethics for Librarians and other Information Workers* (2012) when discussing resource accessibility. The FAIFE (Committee on Freedom of Access to Information and Freedom of Expression), which defends and promotes intellectual freedom in international library communities, published this principle in 2012. The principle covers the core of librarianship, the role of information institutions and information professionals, and information rights, that is, the need for information sharing. The principle provides suggestions on the conduct of information professionals to help them address dilemmas, and provide transparency to users.

As discussed, international cataloging traditions and guidelines, conceptual models, and established principles form the "installed bases" of RDA. While RDA attempts to incorporate international cataloging traditions and guidelines, the influences of the Anglo-American cataloging traditions are prominent. The culture-embedded tradition shapes what is considered as default (e.g., English as the resource language and description language), and reflects in the

cataloging examples in RDA. The conceptual models provide a way to analyze resources and the structure for resource description. In the case of RDA, we see how the working groups influence FRBR, FRAD, and FRSAD. We see how cultural influences, in the form of different perspectives, suggestions, and concept definitions in the models, led to the need for developing LRM to consolidate the three models. The three principles, while geared towards international information professionals, have cultural influences through promoting the prioritization of certain warrants in the guidelines and suggestions. For instance, highlighting a list of functions and objectives of library catalogs, supporting open access and emphasizing access warrant to influence the culture of information access, and publishing the code of conduct of information professionals to shape the culture (e.g., expected behaviors) of this profession.

Reviewing the installed bases of the three standards, we can apply the working categorization of standards and standardization that I proposed at the beginning of this chapter. CCL is based on multiple levels of standards and practices. The card catalogs and naming conventions are at the institutional level (i.e., University of Nanking). The traditional Chinese catalogs and classifications are at the community level and national level (e.g., the bibliographic sections of the official history in different dynasties). The Western classification schemes are at the community level (e.g., EC and SC) and international level (e.g., DDC and LCC). The contemporary Chinese classification schemes are at the institutional level (e.g., the *Bibliography of the Mengfang Library*) and the community level (e.g., Doo's *Universal Classification*). By identifying these levels of standards, we have a better understanding of the sources of cultural influences, in the forms of classificatory decisions, scheme structure, class names, and warrants prioritization, in CCL. They map to *B.6. Standards, Practices, and Principles* in the knowledge organization process.

NDC is also based on different levels of standards. The Western classification schemes are at the community level (e.g., EC and SC) and international level (e.g., DDC and LCC). The contemporary Chinese classification schemes are at the community level, since they were applied in more than one library, but not commonly used as a national standard at the time. While Mori did not name the other contemporary Japanese classification schemes he critiqued, considering the context of developing NDC was a lack of national bibliographic classification, the standards are likely at the institutional level and community level. These standards and their cultural influences shape the classification structure, adaptation approaches, and warrant prioritization in NDC. It is an example presenting how B.6. *Standards, Practices, and Principles* can be cultural, due to the cultural influences of different levels of standards. In this case, we see cultural influences in the context of standard development (e.g., the need to develop a national bibliographic scheme that serves the local community, while realizing the true spirit of a benchmark scheme, DDC), and in the scheme design (e.g., notations for localization).

Unlike CCL and NDC, as an international cataloging guideline, RDA presents the perspective of the "global" side in the global-local tension. We can review the levels of standards that serve as its foundation, and examine how diverse the sources of cultural influences RDA incorporate. According to the editorial documents, RDA incorporates "international cataloging traditions and guidelines," but it remains unclear which cataloging guidelines are included besides AACR2, which has an Anglo-American focus and was a widely adopted standard at the international level. In the fieldwork, however, I did observe examples of library communities (e.g., East Asian Libraries in the U.S.) proposing best practices that serve particular user groups to PCC guidelines

(SEE footnote 5). The conceptual models, FRBR, FRAD, FRSAD, and LRM, and the three principles, the *Statement of Principles*, the *Statement on Open Access*, and the IFLA *Code of Ethics for Librarians and other Information Workers* are standards at the international level. Unlike AACR2, the embedded cultures in these models and principles are not tied to specific geographic regions or a language. These standards are based on the perspectives that are approved by the respective editorial committees. The cultural influences of these standards shape the way information professionals describe resources (e.g., the conceptual models), the prioritization of warrants (e.g., the functions and objectives of library catalog), the practices of information access (e.g., the open access principle), the role of information professionals, and the default user groups. Through close examination of the standards that support RDA, we collect examples of cultural influences in different steps of the knowledge organization process. There are traces of cultural influences in the editorial committee that design knowledge organization standards (B.2. Agents), in the objectives of resource descriptions (B.3. Descriptions), and in the intended resource types and user groups of standards (B.6. Standards, Practices, and Principles).

This section presents an analytical approach to break down the sources of cultural influences of a knowledge organization standard. Through identifying the existing standards, practices, and principles that inform and shape a knowledge organization standard, we can examine the aspects and manifestations of cultural influences (e.g., intended users, classification structure, naming conventions). Furthermore, we can apply the level of standards categories to the "installed bases" to gain a better understanding of the scale of influences each source of cultural influence may have on a standard. The approach and the categories are analytical tools to enhance the granularity of

analysis for cultural influences in knowledge organization standards and the knowledge organization process in general.

Levels of Standards and Standardization in Practice

In the 43 observation sessions in the field, I observed variant types of knowledge organization standards. Catalogers weave the standards of different scopes and levels together to describe resources. Through examining cataloging scenarios and identifying the standards that shape resource descriptions, we can go one step further from recognizing that resource descriptions are cultural. We can discuss specific sources of cultural influences, and where and how each source affects a resource description. This section will introduce the different types of knowledge organization standards observed, the communities and networks that contribute to cataloging practice standardization, and examples of catalogers maintaining and improving standardization in practice.

Cataloging Guidelines

The types of knowledge organization standards observed are cataloging guidelines, classification schemes, controlled vocabularies, metadata schema, conceptual models, coding schemes, unique identifiers, standards for translated works, and standards for systematic arrangement. There are different levels of cataloging guidelines. At the institutional level, there are best practices of the local library for describing particular resource types, such as comics and graphic novels. At the national level, there is DACS (Describing Archives: A Content Standard). According to the Society of American Archivists (2021), DACS is the U.S. implementation of international standards, ISAD (G) and ISAAR (CPF), to describe archival materials of all types and their creators. At the international level, there are CGCRB, AACR2, RDA, and the Provider-neutral guideline. CGCRB (Cataloging Guideline for Creating Chinese Rare Book Records in Machine-Readable Form) is a cataloging standard mentioned in the previous chapter. In the cataloging

project Q and Z worked on, they used CGCRB for Chinese rare books, and applied RDA for other resources. CGCRB provides guidelines for libraries in North America for cataloging Chinese rare books. AACR2 and RDA are cataloging guidelines for resources of all types, and they are widely used in libraries worldwide. There is also the *Provider-neutral guideline,* which is a part of the *Bibliographic Formats and Standards* guide published by OCLC (2020). The guide provides definitions, guidelines, and examples to help international information professionals input and share information through WorldCat, the union catalog of "the world's largest network of library content and services." (OCLC Online Computer Library Center, n.d.). At the network level, there are PCC guidelines. PCC (The Program for Cooperative Cataloging) is an international cooperative effort. The members participate in program events, standing committees, and task groups. Members contribute bibliographic records and related data using PCC guidelines to promote and sustain knowledge. PCC has four programs, BIBCO, CONSER, NACO, and SACO, which focus on bibliographic records, serial cataloging, LC name authority data, and subject authority data respectively. The subject authority data refers to the LCSH, LC Genre/Form Terms for library and archival materials (LCGFT), LC Demographic Group terms (LCDGT), LC Medium of Performance Thesaurus for Music (LCMPT), and LCC (Library of Congress, 2014). While PCC has significant influences from the U.S. Library of Congress, the members are international.

Classification Schemes

The classification schemes applied in the fieldwork were the Library of Congress Classification (LCC) and the *Complete Library in Four Sections* (*Siku quanshu*) categories. LCC was developed in the late 19th and early 20th century to organize the Library of Congress book collections. It was adopted by many U.S. academic libraries, and its influence has increased with wider adoption in academic libraries internationally (Library of Congress, 2014). LCC was a standard at the

institutional level (i.e., the Library of Congress), but expanded its scale of application and influences to the community level (i.e., academic libraries in the U.S.) and international level. The *Complete Library in Four Sections*, as introduced in the previous section, is the largest book collection in the Chinese history. The catalog divides all books into four main categories. In the cataloging project for rare books and special collections, I observed Q assigning a category in the *Complete Library in Four Sections* catalog to a resource, and recorded that in the bibliographic record as another classification besides the LCC classification. This standard is not the first one that used the four categories, as we see in the *Dynastic History* of the Ming dynasty, it used the four categories as well. The catalog of the *Complete Library in Four Sections*, which was compiled based on Qianlong Emperor's order, had great influence on other standards. The cataloged collection was based on royal library collections, catalogs, and books collected from the general public. While the selection criteria exclude particular genres, such as genealogy books and letters, the collection scope is at the national level (Theobald, 2010a).

Controlled Vocabularies

In the fieldwork, I observed the application of several controlled vocabularies, which include LCSH (Library of Congress Subject Headings), LCGFT (Library of Congress Genre Form Terms for Library and Archival Materials), LCDGT (Library of Congress Demographic Group Terms), AAT (Art and Architecture Thesaurus), the Chinese Thesaurus (Han yu zhu ti ci biao. 漢語主題詞表), and a role designator mapping spreadsheet. LCSH, LCGFT, and LCDGT are part of the LC PCC programs, an international network. The application of these standards, especially the LCSH, expanded from network-leveled PCC members to international institutions. The three standards are at the international level. LCSH was established for the Library of Congress library collections

in 1898, and it has been continuously expanded since then. The headings, and inconsistencies of headings, reflect the evolving contexts, such as policies and perspectives, over time. As of March 2020, the LCSH is at its 42nd edition. It consists of 348,246 authority records, including personal names, corporate names, meeting or conference names, uniform titles, topical subject headings, geographical subject headings, and references (Library of Congress, 2020b). LCSH is adopted internationally, especially in academic libraries, to describe the subject of resources. It is a standard at the international level. LCGFT was developed by the Library of Congress in 2007. The purpose of this vocabulary is to distinguish what a resource *is* (i.e., genre/form) from what a resource is *about* (i.e., subject matter). LCSH has been a major vocabulary for resource description, and there are many genre/form headings in LCSH. Before the development of LCGFT, catalogers assign genre/form subject headings to both works of a genre and works about a genre. For example, a poetry collection and a literary critique of a poetry may both have *Poetry* as a subject heading. However, in this case, the former *is* poetry, while the latter is *about* poetry. Using LCSH alone, resource descriptions fail to distinguish genre/form from the subject matter of resources. Acknowledging this issue, the Library of Congress developed LCGFT to strengthen the distinction. After full implementation of LCGFT, LC plans to stop assigning genre/form LCSH to describe resource genre/form, and use those headings solely for subject matter descriptions (Library of Congress, 2020c). Similarly, in 2013, LC developed LCDGT. In LCSH, there are headings that describe the audiences, creators, and contributors of resources (e.g., Children's films; Nurse's writings; English language -- Conversation and phase books (for businesspeople); English fiction -- Welsh authors). Demographic characteristics are often embedded in complex subdivisions. Also, catalogers can assign LCSH that include demographic information to resources *for* particular audiences, resources *by* particular creators/contributors, and resources *about* particular

demographic groups. To make better distinctions, the Library of Congress developed LCDGT, which include 11 categories: age; education level; ethnic/cultural; gender; language, medical, psychological, and disability; national/regional; occupation/field of activity; religion; sexual orientation; social. This vocabulary focuses on describing the demographic characteristics of the intended audience and creator/contributor of resources. After full implementation of LCDGT, LC also plans to assign demographic related LCSH solely for subject matter description (Library of Congress, 2020d).

AAT is one of the five Getty vocabularies. Developed in the late 1970s, it is designed to meet the needs of art libraries and art journal indexing, as well as resource descriptions of museum objects and visual resource collections. The purpose of AAT is to improve the access to art, architecture, and material culture information. The intended users and contributors of AAT include international "art and architectural historians, architects, librarians, visual resource curators, archivists, museum personnel, and specialists in thesaurus construction" (The J. Paul Getty Trust, 2020). The concepts captured in AAT and the user communities are both at the international level.

The Chinese Thesaurus was developed and published in China in 1980. It is divided into three volumes: social sciences, natural science, and appendix. There is a main table for social sciences, a main table for natural science, and indexes. Every term in the thesaurus is mapped to an English term. The Chinese Thesaurus is widely applied in library online catalogs, card catalogs, and subject indexes. In the field, Z created two types of records for every resource. One record follows the RDA guidelines, and is reviewed by Q and shared through OCLC WorldCat. The other record follows the CALIS metadata schema and is shared with CALIS members. When Z created CALIS

records, he frequently assigned headings using the Chinese Thesaurus. Z was so familiar with the standard that he could assign some headings without checking the standard. Considering the contributors and editors of this standard, and the intended scope of application, this standard is at the national level.

The last controlled vocabulary observed is an interesting case. It is a spreadsheet that maps role designators (e.g., author, editor, translator) in Chinese, Japanese, and Korean to English terms. Q created this spreadsheet because East Asian librarians, including herself, often encounter role designator mapping issues in their daily work. In Lee (2017b), I identified and elaborated on six types of mapping issues for role designators. The first type is mixed roles (one-to-many mapping). Take a Chinese role designator 編著 (bian zhu) for example, 編 (bian) means edit or compile, 著 (zhu) means write. Should catalogers assign editor, compiler, author, or all of them? The second type is old or ambiguous terms. Some old Chinese role designators require catalogers to consult reference materials to understand the meanings of the terms. Take 纂修 (zuan xiu) for example, 纂 (zuan) means edit or compile. *Zuan* often goes with 編 (bian) and form a phrase 編纂 (bian zuan), which is a combination of two synonyms and means to edit or compile. What about 修 (xiu)? If we follow the same approach, we might assume that *xiu* means correct or emend, because 修正 (xiu zheng) is a common phrase meaning correct or emend. However, Q looked up the term in a reference resource and clarified that *xiu* means sponsor. *Zuan xiu* is a combination of edit/compile and sponsor. After clarifying the meaning of *xiu*, catalogers face the issue of mixed roles (one-to-many mapping). The third type of mapping issue is synonyms (many-to-one mapping). For example, 著 (zhu), 作 (zuo), 撰 (zhuan), 文(wen) all mean write, and map to the English designator author. The fourth type of mapping issue is homographs (one-to-many mapping). For instance, 譯

(yi) means translate. When it is combined with other words, the meaning may change. 翻譯 (fan yi) means inter-lingual translation. 編譯 (bian yi) means intralingual translation which translate classic Chinese to modern Chinese. Catalogers rely on context to discern the meaning of homographs. The fifth type of issue is homographs across languages. One example is the Chinese designator 藏版 (cang ban) and the Japanese designator 蔵版 (zou ban). The Chinese character 藏 (cang) means collect or own (or hide, which is not applicable in this case). 版 (ban) refers to the printing 'board.' The Chinese cataloging practice uses 藏版 (cang ban) to refer to publisher, keeper of the printing board/printing block, or printer. On the other hand, in the Japanese cataloging practice, 蔵版 (zou ban) means publisher. The same term, while in slightly different writings in the two languages, have overlapping but different meanings. Even after catalogers successfully distinguish 藏版 (cang ban) from 蔵版 (zou ban), they still have to judge whether the term means *publisher*, or other meanings that do not map to any English designator in RDA. The sixth type of issue is no match in English (one-to-zero mapping). For instance, the Chinese role designator 抄工 (chao gong) refers to people who manually copy the text of a work. They are manual copiers before the printing press. The role appears to be similar to the Western tradition of monastic copying of religious texts. After searching the vocabularies in the RDA guidelines, Q could not find a good match. This is one example of having no match in the English role designators. Recognizing the mapping issues, Q created a spreadsheet to record suggested mappings of role designators in English, Chinese, Japanese, and Korean, based on her expertise and research (e.g., consulting dictionaries and reference resources). While still under development, she presented the spreadsheet at a conference with the CEAL (Council on East Asian Libraries) community, which is a committee of the Association for Asian Studies (AAS). The Association focuses on East Asian

libraries and East Asian librarianship, and it has international members. Q received positive feedback from fellow librarians and decided to continue on populating the spreadsheet. After starting this initiative, Q had an opportunity to visit an academic library in Taiwan. The librarians told Q that they also recognized the role designator mapping issues, and they have been establishing an in-house spreadsheet as well. Q and the librarians were able to share their efforts to address the evident role designator mapping issues. With further development, the spreadsheet can potentially evolve from an institutional level standard to an international level standard, as a best practice of the CEAL community.

Metadata Schema

In bibliographic records, classification schemes and controlled vocabularies shape classification numbers and descriptors like subject headings. Cataloging guidelines shape the way catalogers describe resources. Coding schemes, as the foundational structure of the records, set the rules of what metadata elements/fields are included in resource descriptions. This further influences the available access points and information retrieval. In the fieldwork, I observed several metadata schemas, which are MARC 21, BIBFRAME, and the metadata schema used in the CALIS system.

MARC 21 is a set of formats for representing and sharing bibliographic, authority, holdings, classification, and community information in machine-readable form. It was developed by the Library of Congress to share its records. Hence, the standard is influenced by the practices of North American libraries and archives with general and international collections. MARC 21 has been maintained by the Library of Congress. Some national agencies in the U.S. and Canada, namely the National Agricultural Library, National Library of Medicine, United States Government Printing Office, and National Library of Canada, are responsible for certain data elements. As

authoritative cataloging data providers, these institutions have influences over MARC 21 formats. The structure of MARC records implements both national and international standards, including the Information Interchange Format (ANSI Z39.2) and the Format for Information Exchange (ISO 2709). There have been attempts to maintain compatibility between MARC 21 and other national and international MARC formats, such as UKMARC and UNIMARC (Machine-Readable Bibliographic Information Committee [MARBI], 1996). Considering the purposes, applications, development, and maintenance of MARC 21, it is a standard at the international level, with a strong U.S. focus.

The BIBFRAME (the Bibliographic Framework Initiative) project was initiated in 2012 by the Library of Congress. It is a successor to MARC, but with a broader scope. The motivations of developing BIBFRAME are to accommodate variant forms of data in the linked data environment, engaging with the wider information community beyond libraries, and taking more content models, cataloging rules, and data exchange protocols into account. The conceptual model of BIBFRAME is similar but different from the FRBR Group 1 entities (WEMI). There are three entities in the BIBFRAME model, Work, Instance, and Item. However, it does serve the purposes that are similar to the FRBR Group 2 and Group 3 entities, which are disambiguating and identifying agents, and recording relationships between entities. In comparison with MARC, MARC records integrate resource descriptions of all kinds at one place. In a MARC record, we can see descriptions of the conceptual work, physical descriptions, subject matter, personal names, and text-based identifiers of a resource. The BIBFRAME model, on the other hand, relies heavily on relationships and uses controlled identifiers to link to a wider pool of data. Also, in MARC records, there is a set of elements and attributes that set a structure of what metadata elements (e.g., title), and what aspects

of an element should be included in a resource description as subfields. Similarly, the BIBFRAME Vocabulary has a set of classes and properties to serve a similar purpose. While RDA and BIBFRAME are independent from one another, RDA is a source of BIBFRAME vocabulary (Library of Congress, n.d.). Intended for international use, BIBFRAME is a standard at the international level, with influences from the Library of Congress and two international standards, FRBR and RDA.

In an observation session with Z, he introduced me to the metadata schema used by the CALIS (The China Academic Library and Information System) community, which is an international network with a strong Chinese focus. In 2000, information professionals in China started developing a metadata standard for Chinese rubbings, rare books, and maps. This standard is expanded from an international metadata schema, Dublin Core. The Dublin Core element set has 15 properties. These properties are generic to describe a wide variety of resources. I observed Z describing resources using the CALIS schema, and documented some observations, metadata properties, or fields, that are tailored to the resource types and purposes of the CALIS system. This is a standard at the network level. First, the unit of analysis of most CALIS records is at the *Item* level. Each resource is treated as an unique item. Z elaborated on why these resources are unique. One reason is printing. Due to the manual printing technique, printers can greatly shape the quality of printing copies. Similarly, copiers influence the quality and even the content of manuscripts through handwritings. One other reason is provenance and preservation. For rare books and special collections, each item has a unique life story. Books printed from the same printing board (i.e., of the same edition) may be in variant conditions and have different value due to the preservation condition and provenance. For instance, a copy owned by a famous writer may be worth way more

than other copies. The third reason Z provided is amendment. Copies of the same edition could go through different amendments. Amendments can change the appearance (e.g., size, cover, binding) of a book enormously, thus influencing its value. For books that were created using relatively modern printing skills, if the copies of the same edition have little variances, the CALIS system describes them at the *Manifestation* level. Most bibliographic records in the library communities describe contemporary works at the *Manifestation* level as well. That is, only one record is created for all copies of an edition. The choice of unit of analysis is tailored to the resource types in the CALIS system.

One noteworthy metadata field is *Scan Images*, which is uncommon in many library catalogs. Z explained that high resolution images help catalogers capture more details, and compare the item at hand with the resource descriptions in the CALIS system. Reflecting on Z's value-adding cataloging practice, as discussed in the previous chapter, having scan images supports the rationale of this practice. With scan images, catalogers do not have to strictly transcribe information from resources, because users have access to resource images. While in Q's daily work, creating and providing resource scan images is not expected by either librarians or users. Without scan images, resource descriptions become the only approach from which users and other librarians can find, identify, and distinguish resources. As a result, faithfully transcribing resource information becomes more critical. This example showcases the relationship between the prioritization of warrants, cataloging practices, and knowledge organization standards.

Besides *Scan Images*, I noticed the lack of authority control in the *Publication Place* field. When we browsed resources by publication places, Beijing City (北京市), Beijing (北京), and Beiping

(北平) were all on the list. If we compare it with the LC name authority records, we see Beijing (China) is the preferred heading, and variants include Beijing Shi (China), Peiping (China), etc. Z explained that the list of publication places was transcribed from the resources. There was no authority control for geographic names because place names and the corresponding regions evolve over time. One region may have different names in different dynasties; and the same place name could cover different regions in different times. Also, Z was not sure if the CALIS system had enough human resources to implement authority control. The evolution of geographic names and the corresponding regions is a shared phenomenon. It is not an issue that is particular to a culture, resource type, or time. The latter reason may be an influential factor that reflects the situation of CALIS.

In CALIS, we can browse resources by 版本類別, which translates to "types of *edition*." However, unlike what we consider as edition in contemporary works, the users and librarians in the Chinese rare books and special collections community use edition to refer to *printing type*. Some possible content of this metadata field includes "wood block edition" and "manuscript edition." A relevant metadata field is *Printing Note*. For rare books, people may print copies using the same printing board (e.g., wood plates) at different times using different papers. This metadata field is designed to describe the printing details. Both *Types of Edition* and *Printing Notes* are metadata fields that are tailored to Chinese rare books and special collections.

One other metadata field that reflects the characteristics of Chinese rare books is the *Title* field. Since Chinese rare books do not have title pages, cataloging rules like the CGCRB provides a ranked list of title sources (SEE footnote 4). Both CGCRB and CALIS prioritize caption titles. It

was in the observation session with Z that he explained the rationale behind the ranking of title sources. According to Z, caption title, as the title on the first page of the main content, is treated seriously by the author, thus more likely to be the preferred/authorized form. Also, it is unlikely to change the caption title. Since content was carved on printing boards, making changes required re-carving the board. As part of the main content, changing caption title entails much re-carving. In contrast, cover titles are less preferred. Cover, as the first page of the book, is easily torn or lost. Also, the printing board for cover is separated from the printing boards of the main content, making it easier to change cover titles. In addition, like contemporary books, there may be advertisements included in the cover title. Z's explanation unveils the technical and social aspects of the printing culture in the past, and shows how these aspects shape the ranking of title sources in Chinese rare books.

Conceptual Models

The conceptual model observed in the fieldwork is FRBR. FRBR is introduced in the *Installed bases of Knowledge Organization* section as a conceptual model of RDA. This framework lays out the relationships between three groups of entities, which are the levels of intellectual endeavors in bibliographic records (i.e., Work, Expression, Manifestation, and Item), the agents that contribute to the creation of the entity described (i.e., person, corporate body, and family), and the subject matter of the entity. It provides a structure for resource description in the library communities. While FRBR was created for variant resource types in library collections, the model, especially the Group 1 entities (WEMI), serves the monograph best. Q and her colleagues encountered challenges when applying the model to non-book materials, such as serials, music collections, and the aforementioned rubbings. For serial publications like journals, title changes, publication frequency changes, merging with other journals or splitting into different journals, are common.

However, these changes add complexity to the identification of WEMI. For music collections like CDs of classical music, one CD often includes multiple tracks. The tracks present an interpretation and performance of one or multiple Works (e.g., Bach's six cello suites BWV 1007-1012) by the artist(s) (e.g., Yo-Yo Ma). Each of the Works in a CD can have various interpretations by many artists in different times. It can be challenging for music catalogers to apply the Group 1 entities (WEMI) of FRBR to resource types like CD, a compilation of multiple tracks that relate to multiple works and agents. Based on the intended scope and practical applications of FRBR to different resource types, we can observe the underlying bibliocentric stance of this model, which is a standard at the international level.

Unique Identifiers

The library community has been using text strings as qualifiers to disambiguate descriptors. For instance, using the birth and death dates or occupations as qualifiers to disambiguate people with the same name. Disambiguation is an approach of authority control. Despite the long-standing practice of authority control, there are limitations. According to Durocher et al. (2017), the LCNAF (Library of Congress Name Authority File) only covers 30% of the names identified in WorldCat. The creation and maintenance of authority data can be a huge burden, which results in outdated descriptions. Also, the communities that collaborate and contribute to authority control are relatively limited to libraries, archives, and museums. Identifying these limitations, identity management has gained increasing attention and adoption. Besides using text strings for disambiguation, information professionals assign unique identifiers to differentiate and track entities. These identifiers are often established standards that are contributed, maintained, and shared by a wider community. In the fieldwork, I observed two unique identifiers, ISNI and ORCID ID.

ISNI (International Standard Name Identifier) is an ISO standard. It is a unique identifier for agents, including persons and organizations that are involved in creative activities. It covers variant types of names, including pseudonyms, record labels, and publishing imprints. The ISNI database is populated by international data sources. The database not only lists variant names of an entity in different languages, but also provides lists of creation roles, related identities (e.g., linking *Clemens, Mark Twain* to *Alden, Jean François* and *Clemens, Samuel*), related names, and the titles they created, contributed to, or performed. ISNI was developed in 2010 by the ISNI International Agency (ISNI-IA), which consists of six organizations. The ISNI-IA members are CENL (the Conference of European national Librarians, jointly represented by the British Library and Bibliothèque nationale de France (BnF)), CISAC (the International Confederation of Societies of Authors and Composers), IFRRO (International Federation of Reproduction Rights Organizations), OCLC, ProQuest, and SCAPR (Societies' Council for the Collective Management of Performers' Rights). After the establishment, the British Library and the BnF, CISAC, IFRRO, and OCLC continued to maintain this database (ISNI, n.d.). As an ISO standard that is developed and maintained by an international group of institutions, it is a standard at the international level.

ORCID (Open Researcher and Contributor) ID is a unique identifier for researchers. It is an international standard to identify researchers and connect researchers with their works at a global scale, across disciplines, borders, and time. Researchers can create an account, get a unique ORCID ID, and maintain their record of publications for free. The ORCID system is supported by organization membership funding from the research community, such as research organizations, publishers, and professional associations (ORCID, n.d.)

Other Standards

Besides the above-mentioned standard types, I observed character encoding standards, Romanization standards, and coding standards. These standards also shape resource descriptions. Character encoding standards determine the displayable character sets. In the field, Q mentioned ASCII code and MARC 8. ASCII code was developed by the ASA (American Standards Association) in the late 1950s, in response to the need of a standard code for international communication. As an American standard, it was first named as the American Standard Code for Information Interchange (ASCII), and later went through name changes to the United States of American Standard Code for Information Interchange (USASCII) and the American National Standard Code for Information Interchange. While nearly all computers at the time had a 6-bit architecture, thus preferred a standard code that is less than 6 bits, the standard committee could not reduce the required characters to 64 or less. After considering the needs and costs, the committee developed the ASCII standard as a 7-bit encoding standard, which encompasses 128 characters (Mackenzie, 1980). In order to accommodate the needs of different languages (non-English letters) and symbols (e.g., £, ¥), many countries developed variants of ASCII. After reviewing the development of ASCII, we know ASCII standard is a national standard with international influences.

In the previous chapter, I introduced conflicts of warrants in the field, and discussed conflicts due to differences and prioritization. Under the Prioritization section, one of the examples is Workaround. In that example, I introduced an encoding standard, MARC 8. The Network Development and MARC Standards Office at the Library of Congress and the Standards and the Support Office at the Library and Archives Canada maintain the MARC 21 formats. MARC 8 was

established in 1968 as part of the MARC 21 formats. It is an 8-bit encoding standard. Over time, its character set has expanded from Latin characters to include Cyrillic, Arabic, Hebrew, and Greek scripts and over 15,000 characters used in Chinese, Japanese and Korean (Library of Congress, 2007). It is an international standard with North American influences. MARC 8 covers less characters than Unicode, but some libraries still use MARC 8 due to varying levels of technical support and infrastructural limitations. In the cataloging scenario, we see catalogers in different institutions using synonyms or similar characters to replace a character that failed to display in the MARC 8 encoding standard. The workaround highlights how the limitations of encoding standards can shape resource descriptions.

Romanization standards are applied to represent non-Roman scripts using Latin scripts. In the field, I observed Chinese Romanization standards and the ALA-LC Romanization table. In the previous chapter, under the *Conflicts of warrants in the field* section, there is a cataloging scenario on selecting the preferred form for Sichuanese. In that section, I introduced three Chinese Romanization standards, Hanyu Pinyin (漢語拚音), Wade-Giles (韋氏拚音), and Tongyoung Pinyin (通用拚音). As introduced, Pinyin (Hanyu Pinyin) was developed by China and expanded its influences on an international level. The Pinyin conversion project in 2002 is a sign of increasing adoption of Pinyin. Wade-Giles was popular in Taiwan and Hong-Kong. It was the most popular Chinese Romanization standard at an international level before 1979. Tongyong Pinyin is a standard at the national level that is developed and used in Taiwan. There are conversion tables between these standards. However, through the cataloging scenario, we see the challenges and issues of having multiple Romanization standards of a language. The social, political, and temporal aspects of these standards add layers of complexity to the adoption of these standards.

Besides the Chinese Romanization standards, there are ALA-LC Romanization Tables. At the time of writing, there are 75 tables that transliterate non-Roman scripts. In the Chinese Romanization table, there are instructions on spacing (separation and connection of syllables), capitalization, punctuation, date representation, and a mapping table between Wade-Giles and Pinyin. These tables are standards at the national level. They are maintained by the Library of Congress and the American Library Association (ALA). The tables are especially important in the MARC formatting conventions and U.S. cataloging practices. MARC formats do not necessarily support the display of non-Latin scripts due to the limitation of encoding standards. The U.S. cataloging practices and standards, such as AACR2, record the Romanized forms in the "regular" fields, and record the original scripts in the parallel fields. With the technical constraints and cataloging conventions, catalogers need to rely on Romanization tables to describe non-Latin script data. While the new international cataloging guidelines, RDA, allows catalogers to transcribe original scripts, recording the Romanized forms is still critical for information professionals and users who do not have corresponding language expertise (Library of Congress, 2017a, 2018).

Cutter Table is one other coding standard observed in the field. Named after Charles Ammi Cutter, the table was first developed in the late 19th century for arranging books in the same class. Over time, the table was expanded and revised to serve the Library of Congress, and adopted by libraries worldwide. It is an international standard with U.S. focus. Cutter table is closely related to the Library of Congress Classification (LCC) and shelving. In the cataloging process, catalogers assign a unique call number to each resource. A call number consists of two parts, the class number and the book number. Catalogers use a classification scheme to assign a class number, which

represents the main subject matter of a resource. To distinguish resources in the same class, catalogers assign book numbers to ensure the uniqueness of call numbers. Librarians then shelf resources based on call numbers. For libraries that use LCC, class number assignment is based on LCC, while book numbers are represented by Cutter numbers (Library of Congress, 2020e).

Networks and Standardization

In the knowledge organization process, standards, practices, and principles are approaches to improve standardization and sharing of resource descriptions. As introduced in the above sections, catalogers apply multiple standards in one resource description. The standards may have different scopes. They may be designed for variant purposes and intended user communities, and carry variant values, perspectives, and cultural influences. Besides standards, networks, such as library consortiums and cataloging groups, also contribute to standardization. The two networks I observed in the field, CALIS and PCC, were mentioned in the introductions of relevant standards. In this section, I will review and introduce the networks that coordinate standardization efforts.

CALIS (The China Academic Library and Information System) is an academic library resource sharing consortium. According to Z, who contributed to the development of CALIS, information professionals started developing CALIS after Peking University successfully established its digital library. As one of the libraries that have the richest Chinese rare books and special collections in China, Peking University is a founding member of CALIS. Over time, several academic libraries joined the CALIS consortium. The member libraries create resource descriptions using the metadata schema introduced in the previous section, and share with other members. At the time of writing, there are 30 library members, including libraries in China, the U.S., and Canada. CALIS

is an international network with a strong focus on Chinese rare books, special collections, and libraries.

PCC (Program for Cooperative Cataloging) was introduced in the Cataloging Guidelines section in this chapter. It is an international cooperative effort with a strong influence from the Library of Congress. The four programs in PCC are BIBCO, CONSER, NACO, and SACO. These programs coordinate members' efforts and develop guidelines and best practices for creating bibliographic records, serial cataloging, LC name authority data, and subject authority data. In cataloging practices, we can view network leveled standards like the PCC guidelines, and standards at the national level or institutional level as add-ons to the international cataloging rules. Guidelines like RDA provide general rules and principles. To accommodate international user communities with variant needs, international standards are often deliberately general, and even vague. Catalogers may have multiple sanctioned options when describing a resource. In that case, standards of different levels, like the PCC guidelines, can complement the general rules and provide more guidance and instructions. Ideally, these levels of standards do not conflict with the general rules. When conflicts happen, catalogers have to navigate different levels of standards, make judgmental decisions on the standards to follow, in order to describe resources.

Besides the two networks, I observed two examples of levels of standards and standardization in the field. One example is the resource management levels in ALMA, and the other example is the OCLC institution records. ALMA is an integrated library system that supports multiple aspects of library operation, such as acquisition, cataloging, and circulation. In ALMA, the structure of its resource management system has three levels: institutional, network, and community. The

categorization indicates the influences of different levels of standards and networks to library operations, which echoes my observations. OCLC institution records record institution-specific information, such as the URI of an e-resource. Institution records also play an important role in the communication and sharing between the members of the same consortium. In 2015, OCLC announced the discontinuation of institution records, and used Local Bibliographic Data (LBD) to serve similar purposes (e.g., storing local notes and local subject headings) in the linked data environment. The practice of having records, either in the forms of institution records or LBD, to record local resource descriptions is one example that highlights the levels of standards and networks in cataloging practices.

So far, we have seen how groups of institutions at different scales collaborate to maintain and improve standardization. Even within an institution, there may be local policies and best practices to standardize knowledge organization actions. In the field, I also observe efforts of standardization at the individual level. As Šauperl (1999) observed in the close examination of catalogers' classification process, catalogers often reference existing records. Affirming the findings, I observed that the influences of previous records are not limited to classification. Besides referencing the class numbers and subject headings in previous records, catalogers refer to variant components in a record, which are tied to variant standards of different levels. The action of referencing previous records and making the same decision is an approach to warrant systematic arrangement and standardization. For instance, I observed Q and Z referencing records in WorldCat and CALIS for subject headings, class numbers, title information, the meaning of a term, series title information, volume information, descriptive template of a particular resource type, and publication information.

Class numbers and subject headings are two major pieces of information that catalogers refer to from previous records. Catalogers may copy the information if they agree with the classificatory decisions. In this case, the previous record does not necessarily have to describe the identical resource. For instance, in one cataloging scenario, Q described a Chinese rare book, and the genre is a particular type of novel, *bi ji xiao shuo*（筆記小說）. *Bi ji xiao shuo* can be further divided into *zhi ren xiao shuo* (志人小說), short stories of famous people, and *zhi guai xiao shuo* (志怪小說), short stories of gods, ghosts, spirits, etc. The resource Q had at hand was the latter. She searched OCLC for bibliographic records of works in the same genre, and observed how other catalogers described this particular genre using LCSH. In the end, she followed what the others did and assigned the subject heading *Ghost stories, Chinese*, and LCGFT *Ghost stories*. One other example is a cataloging scenario of a translated work. The book was written in Korean, which was translated from the original work in Mongolian. When Q classified the translated work, she referenced the class number of the original work, and revised the class number using the translation table. In the two examples, we see that catalogers may copy information from the records of similar but different resources, such as resources of the same genre, or resources of different editions. Also, instead of copying the class number from records that describe the identical work or similar work (e.g., the same work but different editions), catalogers may search for records that assign particular subject headings, and check the class numbers assigned. This is a strategy to collect possible choices of class numbers. After referring to previous records, catalogers may disagree with the classificatory decision and assign different class numbers or subject headings. For instance, in a local cataloging training session, Q emphasized the importance of verifying class numbers when copy cataloging from existing records. The verification can avoid assigning obsolete numbers.

Also, I observed two cataloging scenarios in which Q assigned a different class number instead of adopting an old class number in the referenced record.

Title is a critical access point, and it is a piece of information cataloger may reference from other records. In one cataloging scenario, Q referenced a German record that describes the same scroll at hand. The title in that record was longer than what Q transcribed from the scroll. After further examination, Q found the latter half of the title information covered up by a sticker. She was able to recover the content under the sticker and provide the complete title of the scroll. Title information becomes more complex for series. In one other cataloging scenario, Q reviewed a record of a book, which is part of a series. There was a series title in the record, but Q could not identify the series title source from the book at hand. After communicating with Z, who created the record, he explained that he copied the information from a similar record. Based on his best judgment, that record describes a book in the same series as the book in the local collection. This explains his decision of copying the series title. However, after examining the record Z referenced to, Q noticed that the page number recorded in that record was different from the page number of the book at hand. In the end, Q decided to remove the series title from the record. The two scenarios showcase how catalogers may reference previous records for title information, and the action of referencing does not guarantee adoption of any cataloging decisions.

Catalogers may reference previous records for term definition. In one cataloging scenario, Q described a book titled *Xi ling xiao han ji: er juan* (西泠消寒集: 二卷). The meaning of the phrase *Xi ling* (西泠) was not clear. If the phrase is a place name or terminology, it should be recorded as *Xi ling*, if not, the Romanization would be *Xiling*. To record title information with the correct

spacing, Q looked up the phrase online but did not find much. She then referenced records in OCLC that include the phrase, and inferred that it should be a place name. Referencing previous records clarified the term definition, Q used *Xi ling* instead of *Xiling*.

When describing uncommon resource types, catalogers may use records of the same resource type as descriptive templates. For example, in one cataloging scenario, Q described a rubbing of a portrait of Guan, Yu (160-220), a famous general in the late Eastern Han Dynasty. She used the record of a rubbing of Confucius's portrait as a template, and replaced the content in some MARC fields to describe the resource at hand. This is an efficient strategy to catalog unfamiliar resource types. Through following good quality records of the same resource type, a cataloger can avoid missing critical information or recording descriptions in an incorrect format. We can see the adoption of descriptive structures from previous records as a voluntary standardization effort.

Previous records can provide publication information. For example, Q once cataloged a digitized title, *Women's Culture* (*Fu nu wen hua.* 婦女文化). The local library has access to the digitized 1930 edition of this title through a database. In the cataloging process, Q identified missing and inaccurate publication information in the database. Concerned about the quality of vendor-provided metadata, she referenced a record of the digitized 1970 reprint edition of the same title in Hathi Trust. One other scenario is related to language and volume information. Q described a work of two volumes, with Chinese volume "number" 上 (top) and 下 (bottom). After referencing the records created by two other libraries, Q realized that the complete work should consist of three volumes, "numbered" 上 (top), 中 (middle), and 下(bottom). The local collection was incomplete. It only has volume 1 and volume 3. This particular Chinese numbering convention makes it

difficult to detect the incompleteness of the book set. While 上 (top) unambiguously maps to volume 1, 下 (bottom) refers to the final volume. For a book set of two volumes, 下 (bottom) maps to volume 2. While for a book set of three volumes, 下 (bottom) maps to volume 3. Without knowing whether there is a 中 (middle) volume (i.e., volume 2), it is challenging to judge whether volume 下 (bottom) should be volume 2 or volume 3. Through referencing the other records, catalogers can verify volume information that is particularly complex due to the language and numbering convention.

Besides referencing bibliographic records, catalogers may reference authority records as well. When Q described an archival collection, she had to compile a list of searchable keywords (e.g., names) for that collection, and submit the list to the system manager to improve the search features. During the compilation process, Q referenced the LC authority records, and added Pinyin form and variant forms to the list of keywords. This is one example of improving standardization through conforming to established standards, records, and practices.

In this section, we reviewed examples of many types of standards and standardization that are applied in the knowledge organization process. Also, I applied the categories of levels of standards that were proposed at the beginning of this chapter: institutional level, community level, national level, international level, and network level. After applying the proposed categories, I have some observations. First, the categorization of levels of standards and standardization is dynamic. The categorization may change over time, especially when a standard becomes increasingly popular and adopted by institutions beyond the intended users. LCC and LCSH are two examples. Both

standards were developed as an institutional standard for the Library of Congress. With increasing adoption, both became international standards. From these examples, we know that to apply these categories to identify the levels of standards, and assess the cultural influences embedded in the standards, we should take the temporal aspect of categories into account.

The second observation is that historical context may complicate categorization. The catalog of the *Complete Library in Four Sections* (*Siku quanshu*) is a challenging case to categorize. I categorized it as a national leveled standard based on the scope of the collection. The catalog was based on the royal library collections, catalogs, and literature collected and deposited from the general public at the "national" level, in the Qing dynasty. At that time, there was no contemporary library system, and it is challenging to categorize the level of standard by its scope of application.

Some standards are dependent on or paired with other standard(s). For example, FRBR is one of the core conceptual models underlying the cataloging guideline, RDA. Resource descriptions that follow RDA can be represented using BIBFRAME, a metadata schema. This schema is based on a revised version of FRBR. Also, the encoding scheme MARC 8 is part of the MARC 21 formats. The coding standards Cutter Table is closely related to the Library of Congress Classification. The combination of LCC class numbers and Cutter numbers can formulate call numbers for resources. Also, we can identify many forms of cultural influences embedded in the standards, such as resource scope, resource type, intended users, and domain focus. By closely examining the standards in a resource description, we can identify the relationships and influences between standards, and decipher the sources of cultural influences in resource descriptions. In Table 6, I summarize the above analysis of knowledge organization standards using the proposed categories

of levels of standards and standardization. Besides the categories and standards, I add observations about individuals' actions to warrant standard and standardization.

Based on the observations and analysis, I identified a set of elements in knowledge organization standards that serves as an analytical tool to specify sources of cultural influences in the standards. The elements are (1) the application scale of a standard (e.g., institutional, national), (2) network (e.g., library consortiums and cataloging groups) and any focus on resource type or domain (e.g., special classifications), (3) the developers, editors, or editorial committee of a standard, and (4) the time or temporal context when a standard was created. Table 7 presents the application of this tool to five standards as examples. In the following section, I will use a selective set of standards to discuss cultural influences in knowledge organization standards.

<table>
<tr><td>INSTITUTIONAL LEVEL</td><td rowspan="6">INTERNATIONAL LEVEL
● CGCRB [North America]
● AACR2
● RDA
● Provider-neutral guideline
● LCC [institutional → community → international]
● LCSH [institutional → international]
● LCGFT [Developed by network leveled PCC. Applied internationally.]
● LCDGT [Developed by network leveled PCC. Applied internationally.]
● AAT [with domain focus on art, architecture, and material culture]
● MARC 21 [with North American focus; Maintained by LC and the Library and Archives Canada]
● BIBFRAME [influenced by LC, FRBR, and RDA]
● FRBR
● ISNI (International Standard Name Identifier)
● ORCID (Open Researcher and Contributor) ID
● MARC 8 [with North American focus; Maintained by LC and the Library and Archives Canada]
● Pinyin (Hanyu Pinyin) [national → international]
● Wade-Giles
● Cutter Table (institutional → international with U.S. focus)</td></tr>
<tr><td>● OCLC institutional record; Local Bibliographic Data (LBD)
● Best practices in the local library
● Role designator mapping spreadsheet [This can be developed into an international leveled standard for the CEAL community]</td></tr>
<tr><td>COMMUNITY LEVEL</td></tr>
<tr><td>● ALMA resource management levels (e.g., the SUMMIT consortium)</td></tr>
<tr><td>NATIONAL LEVEL</td></tr>
<tr><td>● DACS (Describing Archives: A Content Standard)
● The catalog of the Complete Library in Four Sections (Siku quanshu)
● The Chinese Thesaurus
● ASCII code [with international influences]
● Tongyoung Pinyin
● ALA-LC Romanization Tables [maintained by LC and ALA]</td></tr>
<tr><td>NETWORK LEVEL</td><td>INDIVIDUAL’S ACTIONS to account for standard warrant and standardization warrant</td></tr>
<tr><td>● PCC guidelines [with LC influences]
● CALIS metadata schema [Expanded from Dublin Core. Tailored to Chinese rare books and special collections]</td><td>Besides interpreting and applying levels of standards and standardization, individual catalogers may reference many components in other bibliographic or authority records for cataloging decisions. The components include class number, subject headings, title information, term definition, descriptive</td></tr>
</table>

	template for certain resource type, publication information, and the preferred form and variant forms of subject headings.

Table 6. Levels of Standards and Standardization.

Elements of KO Standards	Example 1	Example 2	Example 3	Example 4	Example 5
Standard	Role designator mapping spreadsheet	The catalog of the Complete Library in Four Sections (Siku quanshu)	Library of Congress Classification (LCC)	Art and Architecture Thesaurus (AAT)	MARC 21
Application scale	Institutional [→ International]	National	Institutional → Community → International	International	International
Network (any focus on Resource types or Domains)	CEAL community	Chinese resources, especially rare books	Academic libraries	Art, architecture, and material culture	General
Developers, Editors, or Editorial committee	CEAL members	Scholars followed the Qianlong Emperor's order	Library of Congress	Getty	Library of Congress and the Library and Archives Canada
Origination Time	Since 2016	1773-1792 (Qing dynasty in China)	Since the late 19th century	Since the 1970s	Since 1999

Table 7. Elements of Knowledge Organization Standards to Identify Sources of Cultural Influences

Knowledge Organization Standards being Cultural

In the previous section, we see how various standards at different levels weave together in resource descriptions. In examining the standards, we identified traces of cultural influences in variant forms. In this section, I will take a closer look at some standards to discuss the observed

manifestations of culture. The standards are CGCRB, AAT, BIBFRAME and RIMMF, and Cutter Table.

CGCRB (Cataloging Guideline for Creating Chinese Rare Book Records in Machine-Readable Form) is an international cataloging guideline for Chinese rare books. Specifically, it is designed for North American libraries that follow ALA and LC cataloging rules. It provides guidelines for cataloging Chinese printed books and bound manuscripts produced in China before 1796 (i.e., the end of the Qianlong reign). Books that were produced beyond the specified geographic and temporal ranges are not the intended resources (Research Library Group [RLG], 2009). Libraries can make local decisions to use CGCRB for books beyond the intended scope, with the risk of needs not being met. In the cataloging project that Q and Z worked on, Q did consider applying CGCRB to Chinese rare books published after 1796 for standardized description for Chinese rare books in the local collection. In observing CGCRB and its application, I noticed several traces of cultural influences. The resource scope is culturally specific in geographic, language, and temporal aspects. The resource type is rare books written in Chinese and published in China before the end of the Qianlong reign. About the temporal scope, Q told me that in the Western tradition, it is common to treat books published before 1801 as rare books. Selecting the Qianlong reign may be an approach to account for both the Chinese culture (i.e., using the Chinese dynasties and Emperors' reigns to represent time) and a close enough alignment with the Western practice. Also, as mentioned in *Footnote 4* and the *Metadata Schema* section in this chapter, CGCRB provides a ranked list of title sources. The rationale of the ranking is supported by the printing skills, and the social and cultural context at the time.

AAT (Art and Architecture Thesaurus) is a taxonomy at the international level, with particular domain focuses. As specified in the name of this thesaurus, the content of AAT focuses on art, architecture, and material culture. The intended users of AAT are international art and architecture historians, architects, librarians, visual resource curators, archivists, museum personnel, and specialists in thesaurus construction (The J. Paul Getty Trust, 2020). In 2008, the Getty Research Institute (GRI) collaborated with the Taiwan e-Learning and Digital Archives Program (TELDAP). GRI shared AAT data with TELDAP, and TELDAP developed a Chinese version of AAT, AAT-Taiwan. As part of the collaboration, TELDAP contributed Asian-language content to AAT by identifying unique Chinese concepts and terms that were absent in AAT, creating English translations that fit the established structure, and providing feedback to GRI to add the terms. Some examples are styles of calligraphy scripts, like *standard script (Chinese script)* [楷書], *clerical script* [隸書], and *seal script* [篆書]. AAT represents the cultures and perspectives of the intended communities. The collaboration with TELDAP is an example of incorporating Asian cultures through adding Asian concepts and descriptors into the standard (Chen, Cheng, & Chen, 2013).

BIBFRAME is one attempt to realize FRBRized resource description in the linked data environment, and replace the MARC formats. Led by the Library of Congress, it is one of the most well-known attempts. RIMMF (RDA in Many Metadata Formats), is one other attempt to visualize data descriptions in an RDA and FRBR way, instead of the AACR and MARC way. Catalogers cannot export records using RIMMF like a cataloging tool. It is a free sandbox for catalogers to visualize the potentials of FRBRized records. The software has been developed by Deborah Fritz and Richard Fritz since 2011 (Fritz & Fritz, 2021). BIBFRAME and RIMMF serve different purposes, but both showcase ways to display resource descriptions in a FRBR way. Q has been

involved in BIBFRAME testing, and she also attended talks and workshops about RIMMF. When I was first introduced to RIMMF in 2016, Q shared her observations and comparison between BIBFRAME and RIMMF with me. Both standards were still under development at the time. There have been efforts devoted to creating multilingual interfaces in RIMMF, which seemed to be ahead of BIBFRAME at the time. However, when dealing with translated works, RIMMF only allowed one title as the authorized access point, and placed variant titles, including titles in other languages and scripts, as parallel titles. For resources that have more than one title form, the structure required selecting one form over the others. This is not friendly to regions that have multiple official languages. For instance, in Canada, resources have both English and French descriptions, and the two descriptions should be treated as equally authoritative. It is not ideal to require catalogers using the English information as the primary metadata, and the French information as the parallel metadata, and vice versa. In a later observation session in 2020, Q told me that SINOPIA version 2.0.29, a BIBFRAME editor developed by LD4P2 (Linked Data for Production: Pathway to Implementation), added fields for transliterate title and variant titles. Through these cases, we observe how the assumptions and limitations in metadata schema and tools can undermine ethical representations of different languages and scripts. We also observe that with further development, BIBFRAME and RIMMF have been improving in representing more languages and serving different cultural needs.

Cutter Table is a coding standard for assigning book numbers, which pairs with the LCC numbers to form unique call numbers for resources in a local collection. In the Cutter Table, catalogers assign numbers from 2 to 9 based on the author's last name, and assign expansion numbers if needed. The mapping between numbers and alphabets indicates the assigned shelf spaces. The

alphabets do not divide shelf spaces evenly. For example, if we look at the first part of the Cutter Table (Table 8), for authors with last names starting with a vowel, all names with the second letter that fall between u and y use number 9. If simply adding 9 to the vowel does not create a unique Cutter number in the local collection, catalogers have to expand the Cutter number using the expansion instruction, until the Cutter number is unique to the resource. The number-alphabet allocation in the Cutter Table is English centric. In the English language, some consonants are less frequently used, which explains why alphabets between u and y share one number, while other consonants like b, d, n, and r have their own number (i.e., larger shelf space). When we apply the Cutter number to non-English resources, however, the Romanizations of authors' names may not follow the same pattern of alphabet frequency. Take the Chinese language for example, many Chinese names use Q, X, Y, and Z in the Romanized form. Applying Cutter Table to Chinese names results in lengthy numbers. That is, the shelf space allocated for Chinese resources is more limited than English resources. This may reflect the collection in many U.S. libraries. However, for East Asian libraries in the U.S., the difference between the local collection and the default collection indicated in the standard becomes evident in the form of many lengthy call numbers. In this case, we see how Cutter Table, an international coding standard with U.S. focus, carries embedded language assumptions and influences shelving.

1. After initial vowel								
For the second letter: Use number:	b 2	d 3	l-m 4	n 5	p 6	r 7	s-t 8	u-y 9
2. After initial letter S								
For the second letter: Use number:	a 2	ch 3	e 4	h-i 5	m-p 6	t 7	u 8	w-z 9
3. After initial letters Qu								
For the third letter: Use number:	a 3	e 4	i 5	o 6	r 7	t 8	y 9	
For initial letters Qa-Qt, use 2-29								
4. After other initial consonants								
For the second letter: Use number:	a 3	e 4	i 5	o 6	r 7	u 8	y 9	
5. For expansion								
For the letter: Use number:	a-d 3	e-h 4	i-l 5	m-o 6	p-s 7	t-v 8	w-z 9	

Table 8. Cutter Table (Library of Congress, 2020e).

The above examples include different types of knowledge organization standards: cataloging guidelines, controlled vocabulary, metadata schema, and encoding standard. While this is a selective set of examples, it showcases different manifestations of cultural influences, including resource scope, the perspectives and domains represented, intended users, the default languages and scripts, and the prioritization of metadata that is imposed by structural limitations.

As Smiraglia (2009) points out through case studies of resource descriptions, knowledge organization standards, practices, and principles could raise ethical concerns. For instance,

bibliocentrism is a common cataloging practice that treats books as the default resource type, and indicates that books are better than non-book materials. If a cataloging guideline assumes that all resources have title pages or similar substitutes to transcribe information from, it reflects bibliocentrism. A standard reflecting this perspective can cause ethical concerns by making it easier to describe books, while more challenging to describe non-book resources. In order to provide ethical resource descriptions, knowledge organization standards, practices, and principles should account for cultural influences in variant forms. For example, the cultures from which the resources arise, the potential uses of resources, and the cultural context in which the resources are intended for use, are all possible sources of cultural influences. Resource descriptions that fail to warrant the cultures from which the resources arise, in the forms of resource language, genre/form, and content, etc., risk providing unfaithful, incorrect, or unethical descriptions. Resource descriptions that do not warrant the cultures in which the resources are intended for use (e.g., the needs and perspectives of the intended users), could fail to serve particular groups of users. When there are misrepresentations, biased representations, or lack of representation of cultural perspectives in resource descriptions, users who share those perspectives are not as well served as other users.

Differences in Standards, Principles, and Practices in Practice

In this chapter, we have looked into several knowledge organization standards, principles, and practices. In the knowledge organization process, variant standards and practices intertwine with one another, and shape resource descriptions. By examining some key elements of these standards (i.e., application scales, network and focuses on resource type or domains, developers, origination time, and related standards), we observed different forms of cultural influences in these standards,

and saw how standards can be cultural in different ways. In this section, I will present some scenarios collected in the fieldwork as examples of differences in standards, principles, and practices in cataloging practices. When standards, which bring in cultural influences respectively, differ or conflict with one another, the knowledge organization process becomes even more complex.

RDA and CALIS practices

In the cataloging project that both Q and Z worked on, I observed the RDA-way of cataloging and the practices of the CALIS system. RDA is an international cataloging guideline based on a set of conceptual models, including FRBR. This model breaks down bibliographic resources into four entities, Work, Expression, Manifestation, and Item, and it shapes the structure and unit of resource descriptions. The CALIS practices are tailored to Chinese rare books and special collections. The cataloging project creates two records for each resource. One record follows RDA (for rubbings) or CGCRB (for Chinese rare books), and the other record uses the CALIS metadata schema. The records showcase the differences between RDA and the CALIS practices.

One prominent difference is the unit of description for rubbings. As mentioned in the *Conflicts and Prioritization of Warrants* chapter, in *"The RDA Way of Cataloging is Flipping My Records Upside Down!"* section, I explained Q's and Z's perspectives about describing rubbings. The RDA-way of description treats rubbing as a Work that has at least two other related Works, the original artwork and the stone stele. The CALIS practices incorporate descriptions of the original artworks into the rubbing records. Also, the AACR and RDA cataloging tradition emphasizes the transcription principle. Catalogers are encouraged to try their best to provide "neutral" descriptions by transcribing information from resources. "We transcribe, like a camera.", said Q. Bibliographic

records serve as surrogates of resources. Users will make their own interpretations based on the resource descriptions. In contrast, the CALIS practices allow catalogers to contribute their subject expertise and provide value-embedded descriptions. Catalogers are also encouraged to provide resource scan images as a channel to access the self-representations of resources. For instance, in an aforementioned example, Z assigned a succinct title to a rubbing of an epitaph, containing what the users should/would want to know. The transcribed title is *Wei gu shi chi jie shi zhong du du zhong wai zhu jun shi si kong gong ling yong zhou ci shi wen xian Yuan gong mu zhi ming*. (魏故使持節侍中都督中外諸軍事司空公領雍州刺史文憲元公墓誌銘) The assigned title is *Yuan Hui mu zhi* (the epitaph of Yuan, Hui 元暉墓誌).

One other difference is the unit of description for works with supplements. In one cataloging scenario, the resource is titled *Jiean Ji* (節庵集), with a supplement (*buji* 補輯). The supplement was published later, and it provides publisher information of *Jiean Ji*. In this case, Z treated the supplement as a part of the work, and added the publisher information in the supplement to the record of *Jiean Ji*. However, from Q's perspective, the work *Jiean Ji* and its supplement are related but separate works. In the record that follows RDA guidelines, Q added brackets around the publisher information, and specified the information source in the note field. The differences between Q's approach and Z's approach showcase how culture, in the form of cataloging practices, influence the unit of description, which can result in different resource descriptions.

RDA and CGCRB

CGCRB is an international cataloging guideline with North American influences. It is designed for Chinese rare books published in China before 1796 (i.e., the end of the Qianlong reign).

Applying both RDA and CGCRB in the cataloging project, Q shared her observations of some prominent differences between the two standards: title sources and the note field.

In the cataloging project, Q and her colleagues use CGCRB for Chinese rare books. Since Chinese rare books don't have a title page, catalogers transcribe title information from the ranked list of title sources in CGCRB, which are caption (卷端), end title (尾題), compilation principles (凡例), table of contents (目錄), preface (序), postscript (跋), center column (版心), inner cover (內封面), original printed titled label (原印書籤), and printer's colophon (牌記). In some cases, catalogers can find variant titles from different parts of a book. For example, the title at the center column may be an abbreviation of the caption title. CGCRB instructs catalogers to record the caption title, or the title of the highest rank, in MARC field 245 as the title proper. Variant titles are recorded in MARC field 246. The sources of the varying titles are specified in Chinese in the notes field in MARC field 500. For example, we may see "書名據版心," which means the title was transcribed from the center column. This is different from the RDA guidelines which record the source of a variant title in MARC field 246, subfield i, in English. This difference between RDA and CGCRB shapes resource description in one scenario. In the scenario, Q was cataloging a work titled *Zhu Dongpo xian sheng shi* (*Commentary on Dongpo xian sheng's Poems* 註東坡先生詩). It was created in 1213, and then printed and published by the National Central Library in Taiwan in 2012. Since the 2012 reprint is a contemporary publication, there is a title page. On the title page, there is a note specifying that the work is a reprint of a "jiao wei ben" (焦尾本). The meaning of "jiao wei ben" is related to the preservation of the book. The book from which the National Central Library created a reprint survived a fire. There were burn marks on its colophon. The phrase "jiao wei ben" means there are burn marks on this copy. For contemporary works, copies (Items) of the

same edition (Manifestation) are highly similar. Information like “jiao wei ben” is an Item-leveled description, and it is usually recorded in the note field. However, since the reprint creates copies from a particular item, and records the item-leveled information on the title page, the information becomes a manifestation-leveled description. Q included “jiao wei ben” as part of the title information. Based on the CGCRB guideline introduced above, we know the RDA record of the 2012 reprint would be different from a CGCRB record of the original work created in 1213.

In CGCRB, the note field (MARC field 500) only requires Chinese descriptions. The Romanization form is not required. The note field is important to rare books in general, regardless of the resource language. In CGCRB records, users who do not read Chinese may miss key information, such as the context of the resource, because they cannot comprehend the notes. While both RDA and CGCRB are international cataloging standards with U.S. influences, CGCRB has a more specific scope of resource type and a stronger emphasis on the resource language.

RDA and the PCC guidelines

As an international cataloging standard with a wider application scope, RDA provides the general guidelines. When catalogers encounter cases that require more specific instructions, the PCC guidelines provide best practices to its members to complement the RDA rules. Ideally, PCC guidelines are built on RDA and do not conflict with RDA rules. However, in one cataloging scenario, I observed conflicting instructions from the two standards. In the scenario, Q was cataloging a Chinese painting scroll. For resource types that do not necessarily have title information, like paintings, catalogers can assign devised titles when there is no title. RDA instructs catalogers to assign devised titles in the language of the resource. In the case of the Chinese painting, Q should assign a title in Chinese. However, if Q follows the PCC guideline, the

devised title would be in English, the preferred language of the local institution. From the conflicting instructions, we can observe the different perspectives and the prioritizations of warrants in the two standards. The RDA instruction prioritizes resource warrant, while the PCC guideline prioritizes user warrant.

RDA rules

In the previous sections, we see standards can support different or conflicting perspectives. In the fieldwork, I observed that even the same standard can provide conflicting suggestions, or multiple sanctioned options. In one cataloging scenario, Q showed me an example of selecting the preferred name in LC name authority records. Name authority records is an approach of authority control. Every record lists one preferred/authorized name (e.g., Twain, Mark, 1835-1910.) and other variant names (e.g., Clemens, Samuel Langhorne, 1835-1910). In the case of Grace Kelly, the selection of the preferred name becomes more complex. Grace Kelly was a famous American actress. She married Prince Rainier of Monaco and acquired a title of nobility, Princess Grace of Monaco. Which name should be her preferred name? According to RDA rule *9.2.2.3 Choosing Preferred Name for Person*, "When choosing a preferred name for person, generally choose the name by which the person is commonly known." As an actress, Kelly was commonly known as Grace Kelly. If we only reference this rule, the preferred name would be *Kelly, Grace, 1929-1982*. However, RDA rule *9.2.2.7 Change of Name* instructs that "If a person has changed his or her name, choose the latest name or form of name as a preferred name. Apply the same instruction for a person who has acquired and become known by a title of nobility." Following this instruction, the preferred name would be her latest name, which is the title of nobility, *Grace, Princess of Monaco, 1929-1982*. In the LC name authority record, the title of nobility is the preferred name, and *Kelly, Grace, 1929-1982* is a variant name. In this case, since the commonly known name is

different from the title of nobility, without reviewing rule 9.2.2.7, one may justify the selection of using the commonly known name as the preferred name based on rule 9.2.2.3.

In the above examples, we see how the differences between standards can shape resource descriptions. A local institution selects standards and establishes best practices of application before creating resource descriptions. For instance, in the RDA and CGCRB case, the scope of CGCRB is very specific. In the cataloging project Q worked on, the local library considered expanding the application of CGCRB to Chinese rare books published in China, including those published after 1796. The decision between following the CGCRB scope and expanding its application is a debate of standardization and prioritization of warrants. One approach prioritizes standard warrant and standardizes resource description based on publication year. The other approach prioritizes resource warrant and standardizes resource description based on resource type and potential use. Without thoroughly considering the cultures, in the forms of perspectives and conceptual models that underlie the standards, selecting standards can be challenging. Moreover, it may cause misinterpretations of records. For example, I was surprised to see CALIS records with publication dates around 1000 BC, because I did not know the description was based on the original work, and not the object (e.g., rubbing) at hand. In the case of RDA and PCC guidelines, when the two standards provide different instructions, the choice between prioritizing RDA rules or PCC guidelines can be a form of global-local tension. Following RDA rules supports standardization with a wider community. For U.S. institutions, however, prioritizing PCC guidelines may better serve the local community. The scenario about the language of devised titles is one example. The RDA rules for selecting preferred names show that it is important to identify, interpret, and apply a specific rule, as well as be familiar with the standard as a whole. Catalogers'

familiarity with knowledge organization standards is one form of expertise in the culture of the profession.

6. Resistance

Resistance is a common theme in both the editorial documents of the three knowledge organization standards and the fieldnotes. For this study, *resistance* refers to the actions that seek to change or make changes to the current state. It is an umbrella term that covers variant expressions, with different levels of intensity. It includes actions like pushing back to a standard, intentionally adopting alternatives, proposing revisions to a best practice, and proposing new content or add-ons to complement current standards. Through examining these cases of resistance, we can investigate the motivations for resistance, and discuss whether the motivations relate to cultural warrant. For the culturally motivated resistance, we can identify the motivations as manifestations of cultural warrant in the knowledge organization process. In the following sections, I will start from discussing the forms of resistance in the three knowledge organization standards. The discussion will cover two topics: resistance as a reaction to the breakdown of existing infrastructures, and resistance as a response to the global-local tension in knowledge organization standards. The last section will focus on the expressions of resistance observed in the fieldwork, including (1) workarounds, (2) deliberate omissions, (3) proposal of changes to standards, and (4) choices of principles, traditions, or standards.

Resistance as a reaction to the breakdown of infrastructures

In science and technology studies, infrastructure has many characteristics. One of the characteristics is *becoming visible upon breakdown* (Bowker & Star, 2000). As one type of infrastructure, classification, and other types of knowledge organization standards that shape

resource descriptions, share this characteristic. In the editorial documents of CCL, NDC, and RDA, the breakdown of existing infrastructure is a prominent motivation for establishing the standards.

As introduced in the *Conflicts and Prioritization of Warrants* chapter, I identified four major motivations for developing CCL. One is to reflect the evolving disciplines and needs. To accommodate new knowledge and increase the level of specificity in classifications, the editor Liu addressed the urgency of establishing a discipline-based Chinese classification. One other motivation is the breakdown of existing standards. The categories of the *Complete Library in Four Sections* (*Siku Quanshu*), according to Liu, have flawed principles and cannot accommodate all Chinese books. The other motivations are the lack of a Chinese bibliographic classification standard to support interlibrary collaboration, and the foreseeable issues of fully adopting Western classification schemes. The insufficiency of the *Complete Library in Four Sections* (*Siku Quanshu*) categories and the problematic full adoption of Western schemes are breakdowns of infrastructures. The lack of contemporary Chinese bibliographic classification standard is a lack of infrastructure, which is also a form of broken infrastructure.

In the case of NDC, I also identified four major motivations. One is the lack of a Japanese bibliographic classification standard and indexes, which results in libraries using variant schemes or applying the same scheme inconsistently. One motivation is to establish a Japanese scheme that fully incorporates the strengths of the DDC. Some Japanese schemes at the time claimed to be adaptations of DDC, but from the editor Mori's perspective, those schemes were superficial imitations of DDC. One other motivation is realizing subject collocation across resources in different languages by using one scheme for both Japanese and non-Japanese books. Similar to the

editor of CCL, Mori also pointed out issues of fully adopting Western schemes, and addressed the necessity to develop a scheme that prioritizes local needs and context. The development of NDC is motivated by the breakdowns of infrastructures. The unsatisfactory options of either fully adopting Western schemes or using "superficial imitations of DDC" are breakdowns of existing infrastructures. The lack of Japanese bibliography classification standard is a lack of infrastructure.

The motivations for revising AACR2 and developing RDA include (1) accommodating and improving access to new resource types in the digital environment, (2) improving interoperability with other metadata standards for digital resources, (3) aligning with conceptual models like FRBR and adapting to new database structures, and (4) accounting for more diverse user groups and user behaviors. The installed bases of RDA, the *Paris Principles* and AACR2, broke down because both standards required expansion and revisions to keep up with the evolving digital environment. In response to the breakdowns, RDA expanded the scope of resource type and the categories of users and user behaviors. It also takes technological aspects into account, such as the open access environment, and the interoperability and accessibility of data.

Through examining the breakdowns in the three cases, we can observe how cultural influences weave into the motivations of developing the standards. For both CCL and NDC, cultural influences are embedded in the resistance to fully adopting Western schemes. The foresaw issues raised by the editors were cultural. For instance, Liu's concerns were related to the culture of the Chinese academia at the time, in the forms of research questions asked and research methods used. Mori's concerns were related to religion, philosophy, law, literature, and history classes. These classes have a strong tie to the local cultures and communities. In the development of RDA, the

motivation to account for diverse users is an example of cultural warrant. It is an attempt to take diverse cultural contexts into consideration. Tracing manifestations of cultural warrant through observing resistance, in the form of breakdowns of infrastructures, is a useful strategy. Considering the cost and effort to resist and take actions, the breakdowns that motivate resistance are likely influential to an extent that people cannot ignore. These breakdowns and resistance are hence easier to identify and observe.

Resistance as a response to the global-local tension in KO standards

The global-local tension in knowledge organization is closely related to cultural warrant. The tension is the dilemma between prioritizing standardization or localization. On one hand, conforming to standards of higher levels or standards with wider application scales can improve standardization and interoperability with other resource descriptions. On the other hand, applying a standard that is tailored to local collections, communities, and culture can better serve local users' needs. In the editorial documents of the three knowledge organization standards, I observed the perspectives of both the global side and the local side of the tension. RDA, as an international cataloging guideline, presents the perspective of the global side. One of the purposes of RDA is to account for diverse user groups, and this is an attempt to ameliorate the global-local tension. In CCL and NDC, we can view resistance as a response to the global-local tension from a local perspective. I observed forms of resistance concerning users, resources, notations, and arrangement. These are also manifestations of cultural warrant.

Users play an important role in the justifications for developing CCL and resisting full adoption of Western schemes. One motivation of developing a localized scheme was to serve the Chinese

scholarly community. Also, Liu's justification of the main class sequence is culture embedded. The justification references traditional Chinese classifications, and reflects the Chinese view of the relationships between classes. For instance, following the first main class, *Generalities*, Liu referenced the *Philosophers* Domain in the bibliographic section (*Treatise on Literature. Yiwen zhi.* 藝文誌) of *The Book of Han* (*Hanshu.* 漢書) to justify the decision of listing *Philosophy* as the second main class. For the third main class, *Religions*, Liu adopted the classificatory decision in *The Book of Sui*, and justified the decision of distinguishing *Religions* from *Philosophy*. Liu discussed the connections between all the main classes, using traditional Chinese classifications as justifications. We can infer that the editor designed CCL for a particular user group -- people who share the cultural views in these Chinese classifications.

Resources can be cultural in variant ways. The cultural aspect of resources can be a force that highlights global-local tension and pushes for resistances. In the fieldwork, I observed the cultural aspects of resources. One aspect is the resource content. As Mori (1929) pointed out in NDC, some subjects are particularly tied to the local culture, such as religions and history. The concern with these classes was one reason for Mori's push back against full adoption of Western schemes. Similarly, Liu took local culture into consideration and divided Histories into General History and Dynastic History in CCL. One other cultural aspect of resources is the format. In the *Preface* of NDC, Mori discussed the classification of *Wasōbon* (和装本) or *Wahon* (和本). *Wasōbon* are books made of Japanese paper and bound in particular ways. Mori suggested that libraries with a larger collection of *Wasōbon* shelve these books separately, similar to how children's books are often shelved separately from other collections. Libraries can add a notation W in front of the class numbers of *Wasōbon* for distinction. In this case, the resource format has a strong cultural

influence. The influence is strong enough that the editor resisted treating this resource format in the same way as other formats. Language is one other cultural aspect of resources. Before NDC, many Japanese libraries separate Japanese books from other books. One of the motivations of developing NDC was to resist that practice and use one scheme for books in all languages to realize subject collocation. Resource language is a cultural aspect that can further indicate the intended users. In the next chapter, I will discuss the cultural aspects of resources in more detail.

Notations can show traces of the global-local tension as well. When designing NDC, Mori referenced Chinese classifications and journal articles for approaches to modify decimal notations. The purpose was to collocate Japanese and Chinese materials without breaking the system. This is an example of resisting the full adoption of the Dewey Decimal notation system through adaptation. One other example is the class names in CCL. Liu (1929) explained that "for new knowledge and studies introduced from the West, adopt the name of the new subject as its class name. For subjects that we have been studying, continue to use the name that we are familiar with. For subjects that have both new and old names, use the new name. Prioritize the ease of understanding of the new class names instead of nostalgia or familiarity of the old class names." Liu's strategy is an attempt to balance the global-local tension through selective adoption of new subject names.

Resource arrangement can be an expression of the global-local tension. For instance, in CCL, Liu shared his thoughts on call number notations. Seeing how Western schemes use numbers, alphabets, or a combination of both numbers and alphabets, Liu intended to use a combination of numbers and Zhuyin (Mandarin Phonetic Symbols) for call numbers. After receiving suggestions from colleagues, Liu decided to use numbers only in the end. In order to assign numbers to Chinese

author names, Liu had to apply the Four Corner Codes, which generates a 4-digit number to each Chinese character. Through the Four Corner Codes, the notations for Chinese books and English books can be consistent. Liu's design decisions unveil how classificationists balance between different warrants and the global-local tension. In NDC, Mori explained that "In Japan, traditionally, books were organized by shelf number, which is different from classification. Books of the same subject were arranged by accession number." When Mori designed NDC, one of the purposes was to mix-shelve resources in different languages using one classification scheme. Moving from the local traditional practice to classification and standardization is an example of a decision concerning the global-local tension. "Local needs" can manifest in variant forms, such as characteristics and purposes of the local library. In a quote in NDC, we see the connection between resource arrangement and the global-local tension, highlighting the local needs. "We should classify books by subjects that best serve users' practical use. If there are local needs, localize [the classification] according to the local situation so books are classified and placed at locations that can be best used."

In the above examples, we can view modifications and localizations as forms of resistance to standardization. The signs of resistance are often related to users, resources, notations, and arrangement. These are prominent motivations for resistance and localization.

Resistance in practice -- workarounds, omissions, changes, and choices

In the fieldwork, I observed different forms of resistance in cataloging practices. The prominent forms of resistance are workarounds, deliberate omissions, proposing changes to standards, and

choices of principles, traditions, or standards. In this section, I will go over examples of these forms of resistance.

One example of workarounds is a cataloging scenario in search of author information (Lee, 2019). The resource was a reproduction of a manuscript titled *Gua yao ci jie shi: fen xi "Zhou yi" shi dai zhi she hui bei jing* (卦爻辞解释: 分析《周易》时代之社会背景). The text presents an analysis of the social context in the *Zhou yi* era, which is between the 10th and 4th centuries BCE. According to the resource at hand, the text was written by Ce Ni, who was affiliated with Cornell University and studied the Book of Changes (i.e., *Yijing*, a Chinese classic). There was no name authority record for Ce Ni. To create one, Q examined the text, but found very limited author information to collect from. Online searches did not provide relevant information about Ce Ni either. The only information Q knew was that Ce Ni's family donated his book collection to the UC Irvine libraries. Q contacted the libraries for information about Ce Ni. However, the librarian who processed the donated collection left the position. Q could not reach out to the author's family or get more information. On the inner cover of the reproduced manuscript, it says that Bilun Shi, a professor in Cornell University, provided guidance and feedback to the author. While there was a LC name authority record for *Shi, Bilun, 1931-* , the relationship between Ce Ni and Bilun Shi remained unclear. While Q could create a brief name authority record for Ce Ni, the work of populating more information came to a halt. Four months later, Q discussed this case with a reference librarian, who found an obituary of Ce Ni's wife from the *Cornell Chronicle*. In the obituary, Ce Ni was described as "Tseh Ni, a librarian in Cornell's East Asian Collection from 1962 to 1986, died in 1997" (Cornell Chronicle, 2016). The discovery was critical in that it highlighted the discrepancies caused by different Romanization standards. "Ce Ni" is the Pinyin

expression, and “Tseh Ni” is the Wade-Giles expression. Even after implementing the Library of Congress Pinyin Conversion Project (Library of Congress, 2005), there are still traces of Wade-Giles and other Romanization standards in resource descriptions. Using “Ce Ni” as the only query term risks missing relevant information. Using the new information about Ce Ni, the reference librarian searched “Tseh Ni” on BillionGraves.com, and found his birth and death dates. Q finally collected enough information and to populate the name authority record for the author. This scenario is an example of a non-linear cataloging process. In the scenario, Q consulted multiple sources, and found critical information through unexpected routes. It shows how catalogers may have to be creative and apply tacit knowledge to come up with workarounds. Having to apply workarounds signals resistance to and the breakdown of usual information sources and routines.

The example of deliberate omission as a form of resistance is about the collection and representation of author information. As discussed in Lee (2018), in the digital environment, it becomes easier to collect information, make linkages, and specify relationships. However, previous studies have raised concerns and questions. Moulaison et al. (2014) mention ethical concerns of both recording particular author attributes and the challenge of making the author information searchable. Thompson (2016) addresses privacy and safety concerns about collecting and providing certain author information, such as gender identity. In addition to these concerns, I raised questions about the sources of information. What author information would be both practical and ethical in scope for catalogers to collect from? When Q introduced LCDGT to me in 2016, she emphasized the importance of keeping LCDGT information updated. Q also addressed concerns about the consequences of enriching author information from sources outside of the resource at hand. For instance, if a cataloger collects gender identity information from an author’s social media,

and assigns LCDGT accordingly, there is a risk of outing the person without consent. In one observation session, Q told me that her colleague received a request from an author, who published a work before gender transition. After the transition, the author changed her name. She would like the bibliographic record of the work and the name authority record to reflect the change. Also, she requested complete removal of the name she no longer uses and not listing it as a variant name. Q's colleague followed the author's request and deliberately removed information to support privacy and ethical descriptions. The action of information removal is a form of resistance.

One other prominent form of resistance is the proposal of changes to current standards and practices. For instance, after gaining familiarity with the application of CGCRB, Q considered proposing an expansion of the scope to this standard. If the temporal scope of Chinese rare books expands beyond 1796, catalogers can use the same scheme to describe Chinese rare books in the local collection. While the editorial committee of CGCRB decided not to expand the scope afterwards, a library can still expand the application of this standard at a local level. One other example is proposing new descriptors to a standard, such as LCGFT. In a cataloging scenario, Q successfully proposed a new LCGFT, *Ci*, to describe a Chinese literature genre. The motivation for proposing the descriptor was the resistance and dissatisfaction to use general descriptors like Chinese literature to describe a specific genre. With a similar motivation, Q's colleague proposed adding *manga* as a LCGFT, to distinguish this particular resource type from *Comics (Graphic works)*. However, despite several attempts, the Library of Congress did not approve the proposal, and manga is not a variant form of *Comics (Graphic works)*. The process of proposing changes can be tedious and require much effort. This is especially evident in one cataloging scenario, in which Q proposed a LCDGT, *Zhiqing* (Lee, 2019). *Zhiqing* (知青) is a common abbreviation of

zhishi qingnian (知識青年), which is often translated as the *educated youths*. This term "refers mainly to urban and suburban middle-school and high-school graduates during the Cultural Revolution who were sent to the countryside to work, to settle down, and to be "reeducated" by the farmers there." (Guo, Song, & Zhou, 2006, 74). This is a term that covers a combination of geographical, temporal, and cultural aspects of a demographic group. Works about this group of people often have a combination of these LCSHs: "Youth--China", "China--History--Cultural Revolution, 1966-1976", and "Down to the countryside movement (China)". The class numbers usually emphasize the history of the Cultural Revolution, instead of the demographic group. Recognizing the unsatisfactory representation of this particular group, Q collected supportive opinions from academic publications and submitted a proposal for adding *Zhiqing* as a LCDGT in May 2017. The proposal was rejected in August, because the term went through meaning changes. It changed from *educated youth* since its first usage in 1919 to *sent-down youth* in the *Down to the countryside movement* in the 1950s to 1970s. According to LC's response, it was "not possible to establish an unambiguous heading for this class of persons, in either English or Chinese." Additionally, LC suggested that the current headings are effective in describing works about *Zhiqing*. In response to the rejection, Q collected comments from East Asian libraries in the U.S., and compiled a second proposal with more citations from quality sources to justify the necessity of adding *Zhiqing* as a new heading. The document was sent to LC in March 2018. In May 2018, LC rejected the LCDGT proposal for *zhiqing*, but approved a different form: *Zhiqing* generation, as a LCSH. More details about the preferred form of this term and the shift from LCDGT to LCSH are elaborated in Lee (2019). Through the scenario above, we see how much effort and time can be put into one proposal of change. On the other hand, it shows the importance of cultural influences, and how culture can push for resistance and change.

As discussed in the previous sections on the *conflicts and prioritization of warrants*, and the *differences in standards, principles, and practices in practice*, we see multiple warrants often coexist and compete for prioritization, and multiple levels of standards intertwined in resource descriptions. In the knowledge organization process, local institutions or individual catalogers may have the power to choose one standard, principle, or tradition over others. For example, in three cataloging scenarios, Q assigned AAT descriptors instead of LCSH to describe scroll, rubbing, and calligraphy. The decision was based on the domain focus of AAT on art, architecture, and material culture. Q expected to find more specific terms in AAT to better describe resources.[6] In this case, we can view the decision of selecting AAT as a form of resistance to use LCSH. The decision was based on the cultures represented in the two standards, in the expression of subject focus and the level of specificity of descriptors.

[6] While AAT may have more specific descriptors for some resources, with continual development and revisions, LCSH may also have descriptors at a satisfying level of specificity. At the time of writing, I checked LCSH and found headings for calligraphy, scroll, and rubbing.

7. Resources being Cultural

In the knowledge organization process, resources play an important role. It can influence all the other components. For instance, resource format and genre require the editorial committee of a standard to design particular rules. An institution and individual catalogers may create resource descriptions in different ways when dealing with resources in different formats. To provide accurate and faithful resource descriptions, catalogers need relevant expertise about resource language, content, subject, and context. When resources become a source of cultural influences, it can extend the influences to other components of the knowledge organization process. In this chapter, I will present my observations about the critical cultural aspects of resources. The aspects are format and genre, content and subject, language, and context. In this chapter, we will look at how cultural influences are embedded in resources through examples from the documents about the three KO standards and the fieldnotes.

Format and Genre

Format and Genre are critical aspects of resources, and this is reflected in the codebook. *Format/Genre Warrant* and *Content/Subject Warrant* are the children codes of *Resource warrant*. In the editorial documents of the three standards, I observed several examples of how format and genre shape knowledge organization, especially the systematic arrangement of resources. For instance, the catalog of the *Complete Library in Four Sections* (*Siku Quanshu*) divided books by format and then by discipline. Format was the primary characteristic of division. In the development of CCL and NDC, the editors recognized the need for discipline-based schemes. While both schemes classify resources by discipline, format is a characteristic of subdivision. In

CCL, resources are first classified by discipline, and then by format, geography, time, and language. In the documents, I identified some resource formats with strong cultural influences, such as the orders of the emperor and *Wasōbon* (和装本) or *Wahon* (和本). The former indicates historical and social contexts, and the latter emphasizes the Japanese influences in the material and binding of books. In the editorial documents of RDA, the variation of resource type is part of the motivation for developing this standard. As an international cataloging guideline, one of its purposes is to accommodate various resource formats, including manuscripts, archives, three-dimensional objects, and visual materials. To describe diverse resource types appropriately, it is critical for RDA to accommodate diverse cultures, including the cultures represented by the resources and the cultures of the users that shape their needs and potential use of resources. In the objectives of RDA, we do see both accommodating diverse resources and accounting for diverse user groups.

In cataloging practices, I also observed cases that highlight the cultural aspects of resource format and genre. One example is mentioned in the *Conflicts and Prioritization of Warrants* chapter, under the *Disagreements and Changes* section. The scenario is about the description of a script of Nō, which is also known as Nō (Noh) play. Q assigned the LCSH *Nō plays* and removed the heading *Musicals*, based on her understanding of the Japanese culture. Besides Nō, I observed Q describing a work titled *"Shui mu qing hua" yu "Lei yu"* (『水木清華』與《雷雨》). The work is carved on bamboo slips, and published by Tshinghua University in China. There is textual content and some graphics on the bamboo slips. The text is written by Cao Yu, the author of a famous play *Lei yu*. Cao Yu wrote the play in the Tshinghua University library in 1933, and he donated the manuscript to the university. The library published Cao Yu's essay about his memories of writing the play, in the format of bamboo slips. According to a librarian in the Tshinghua

University library, the choice of format has its cultural meaning. Bamboo slips were the primary writing materials in China before the invention of papers. To celebrate the 100th anniversary of Tshinghua University Library, they chose a format and content with rich cultural meanings. When describing this uncommon resource format, Q searched for existing controlled vocabularies for bamboo slips, but found no descriptor in LCSH, LCGFT, or AAT. Figure 2 is a photo of this work.

Figure 2. *"Shui mu qing hua" yu "Lei yu".* An essay carved on bamboo slips.

One other example of a cultural resource format is seals. In the past, jade seals (玉璽) were the symbols of authority of Chinese emperors. The contemporary use of seals, in the Asian context, is often for formal signatures as name printing stamps. In one cataloging scenario, Q described a set of three stone seals created between 1940 and 1942 (See Figure 3). Placed in a dark beige fabric covered box with blue satin lining, two of the seals are a pair, with lions at the top. A smaller seal was placed in the middle of the box and with an elephant at the top. The Chinese characters engraved on the seals were in the seal script (篆書), which is very different from contemporary Chinese fonts. Neither Q nor I could verify the type of seal script or decipher the content. In order to provide an accurate description, I took photos of the seals and sent the photo to a friend who had experience engraving seals. The friend helped us identify some of the characters to provide richer descriptions. This case shows the importance of cultural and subject expertise to describe resources in a cultural format.

Figure 3. Stone Seal Set.

In one cataloging scenario, Q described a set of two items in a box: an octagon wood container of fortune sticks and a 16-paged accordion-folded book. This is a Japanese fortune telling kit, *Goshinsen* (御神占). (See Figure 4 and Figure 5). Q was not familiar with this resource type. Since I knew Japanese and remembered seeing and using a similar item before, I explained its usage to Q. There is a small hole in the octagon container. The user would shake the container until one of the eight fortune sticks falls out. Every stick has a number on it. Once a stick falls from the hole, the user can check the number on the stick and read the book to find the *Omikuji* with the corresponding number. Each *Omikuji* has comments about several aspects of life, such as luck (うんき), relationship (ゑんだん), traveling (たびだち), and wish (ねがい事). In order to describe this resource, Q took my interpretations and consulted a cataloger who is a Japanese native speaker.

The colleague provided more information about the publisher, *Izumo Taisha* (出雲大社), and its location, and the Romanization of some key information. With the clarification, Q was able to interpret and describe this resource, which requires familiarity with the Japanese culture and language.

Figure 4. *Goshinsen.*

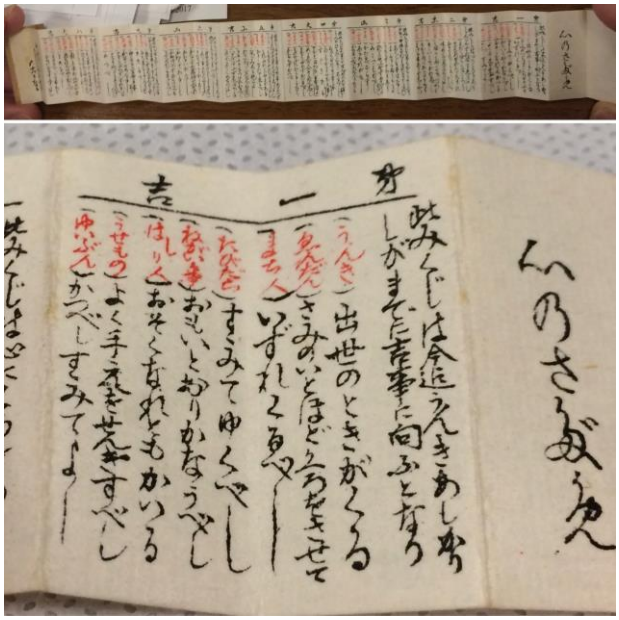


Figure 5. *Omikuji.*

The previous examples present the cultural aspects of resource formats. This example will focus on the cultural influences in resource genres. In an observation session with Y, he was cataloging a Chinese novel. He told me that in traditional China, from a Confucian perspective, novelists had a low status. Gu Ban, the author of *the Book of Han*, adopted the perspective in the now lost Chinese catalog *Seven Epitomes*, and commented on ten Chinese philosophical traditions. Among the ten traditions, Confucianism, Taoism, Mohism, Legalism, the School of Names, Agriculturalism, Syncretism (the Mixed School), the School of Naturalists (Yin-yang), the School of Diplomacy, and Novelists, he ranked Novelists as the lowest. Unlike the other nine traditions, novelists referred to people who collect, narrate, and distribute folklore and rumors. They did not

promote specific philosophical thoughts. Therefore, Gu Ban named the ten traditions as "ten schools" (十家) of thoughts, but only the first nine traditions are qualified as the "nine streams" of thoughts (九流). Novelists were excluded from the important "streams" of thoughts. The term "nine streams and ten schools" (九流十家) has been a common view for centuries. Influenced by this deep-rooted view, many novelists wrote novels using pseudonyms to protect their public image. Some novelists even deliberately include false author information in the novel to avoid readers from discovering their real identity. This is one of the reasons why there has been continual debates and studies about the authorship of some of the most famous Chinese novels, like the *Water Margin* (*Shui Hu Zhuan*, 水滸傳), the *Romance of the Three Kingdoms* (*Sanguo Yanyì*, 三國演義), *Journey to the West* (*Xi You Ji*, 西遊記), the *Dream of the Red Chamber* (*Hong Lou Meng*, 紅樓夢), and the *Plum in the Golden Vase* (*Jin Ping Mei*, 金瓶梅). The example of Chinese novels presents how the cultural perspectives toward a genre can influence the availability of author information, and shape resource descriptions over centuries.

Through the above examples, we see how resource formats and genres can be cultural in different ways. Book materials and bindings can be cultural and influence resource arrangement. Some formats have cultural meanings, such as bamboo slips being a representative material of writing in the Chinese culture before the invention of papers. In the case of the seal set, we see the cultural meanings of seals evolve over time, from the tie to the authority of Chinese emperors to the contemporary usage of formal signature. To interpret and describe the seals and the *Goshinsen* set, catalogers have to be familiar with the relevant cultures and have the language skills, even the expertise to decipher old fonts. The case of Chinese novels showcases the strong and long-lasting influences of a cultural perspective to the concept of authorship and resource descriptions.

Subjects and Content

In the editorial documents of the standards, I observed that cultural influences may embed in resource subjects and content. For instance, Mori mentioned in NDC that the local content in certain subjects, such as history, religions, law, literature, and philosophy, should be highlighted. These subjects are particularly connected to the local culture, hence influenced by the adoption of Western schemes. In the field, I observed how the cultural influences in resource genres relate to resource subjects and content. In a case when Q described a Chinese rare book, the genre is *bi ji xiao shuo* (筆記小說). This genre is a type of novel that is often about short stories of famous people or short stories of gods, ghosts, spirits, etc. The understanding of the characteristics of this genre helped Q with subject analysis of this work. Similarly, in another cataloging scenario, Q reviewed a record for *Yuefu tongkao* (樂府通考). *Yuefu* is a type of Chinese poetry that is sung as folk songs. Q found a similar record in WorldCat, with *Collections*, one of the four categories in the *Complete Library in Four Sections* (*Siku Quanshu*), as a subject heading. The decision was based on the understanding of the genre *Yuefu*. Q adopted the decision from the record she referenced to. However, Y suggested assigning *Histories*, one other category in the *Complete Library in Four Sections* (*Siku Quanshu*) instead, because the latter half of the title, *tongkao*, is a genre of history research. *The Comprehensive Investigations based on Literary and Documentary Sources* (*Wenxian Tongkao*. 文獻通考) is a famous example. It is a general administrative history written in the Yuan dynasty (1279-1368). In the end, Q took Y's suggestion and assigned two LCSH, *Yue fu (Chinese poetry)* and *History and criticism* as subject headings. Succeeding the previous section on the cultural influences in resource format and genre, this section presents examples of how the cultural influences in genres can extend to resource subjects and content. Resource subject analysis may require catalogers' understanding of the cultural context of genres.

Resource Language

Resource language is a key aspect of resources. In the codebook, the scope note of *Language Warrant* identifies two prominent senses, and one of which is resource language. Resource language shapes the design of knowledge organization standards in multiple aspects. For instance, the purpose for developing CCL was to "establish an appropriate and user-friendly classification scheme based on the Chinese collection in the University of Nanking Library." Resource language is one criterion of the scope of this scheme. Resource language also plays an important role in the development of NDC. One of the purposes of establishing NDC was to use one scheme for resources in different languages. This goal can not only realize subject collocation across languages, but also better accommodate multilingual resources. Also, through cases like using J as the mnemonic character for children's books, we see how Mori designed mnemonic devices with resource language in mind. In addition, in both CCL and NDC, resources are first divided by discipline, and then by other characteristics of subdivision. Resource language is a common characteristic in the two schemes, along with format, geography, time, etc. For RDA, as an international standard, one of its purposes is to expand its scope of resource types and take more diverse user communities and needs into account. The scope of resource type is not limited to the variation of resource formats, such as digital resources, archival materials, and books. To serve diverse user communities, it is important to design the guideline with a wide range of resource languages in mind. Through examining the objectives of RDA, we can see examples of warranting resource language(s). For instance, the guideline for selecting the preferred name for a person, family, or corporate body is to prioritize the most commonly used name, and then the name in the preferred language of the agency that creates the description. Similarly, to select the preferred resource titles, the first choice is the title that is frequently used in the original language. Resource

language (Language Warrant) is prioritized over other options, such as the name that is common in reference sources (Literary Warrant), and the name that users might expect (User Warrant). Also, the transcription principle emphasizes resource language. According to the objectives and principles of RDA, “Data that is not transcribed from the resource itself should reflect common usage in the language and script preferred by the agency creating the data." (Joint Steering Committee for Development of RDA, 2009). This quote is an example of prioritizing resource language and the transcription principle over the preference of the local institution, which often reflects user warrant. Since language is a critical medium that carries cultural influences, the prioritization of resource language warrant showcases the influences of cultural influences in resource descriptions.

Through the fieldwork, I collected cataloging scenarios that highlight the cultural influences in resource languages. The first scenario is about a set of multi-language rare books published between 1644 and 1911 (See Figure 6). This set is a dictionary written in four languages, Manchu, Mongolian, Chinese, and Tibetan, which explains why the books are left-to-right, unlike most Chinese books. Q recorded the Romanized titles of all four languages, *Duin hacin-i hergen kamciha buleku bithe* (Manchu), *Dөrben zүil-үn үsүg qabsurugsan toli bicig* (Mongolian), *Skad bzhi shan sbyar ba’i me long gi yi ge* (Tibetan), and *Si ti he bi wen jian* (Chinese). Since the four languages have similar proportions in the content, Q had to choose a primary language to assign a class number. After referencing other records in WorldCat, Q saw many records use Manchu, and some use Chinese, as the primary language. She followed the classificatory decisions of other colleagues and selected Manuchu as the primary language, and assigned class number accordingly. The titles in the three other languages were recorded as parallel titles. This case presents the

complexity of describing multilingual resources. Resource languages shape the resource format (e.g., left-to-right). Also, with limited language skill, a cataloger may have to rely on previous records or colleagues with relevant language expertise to create resource descriptions.

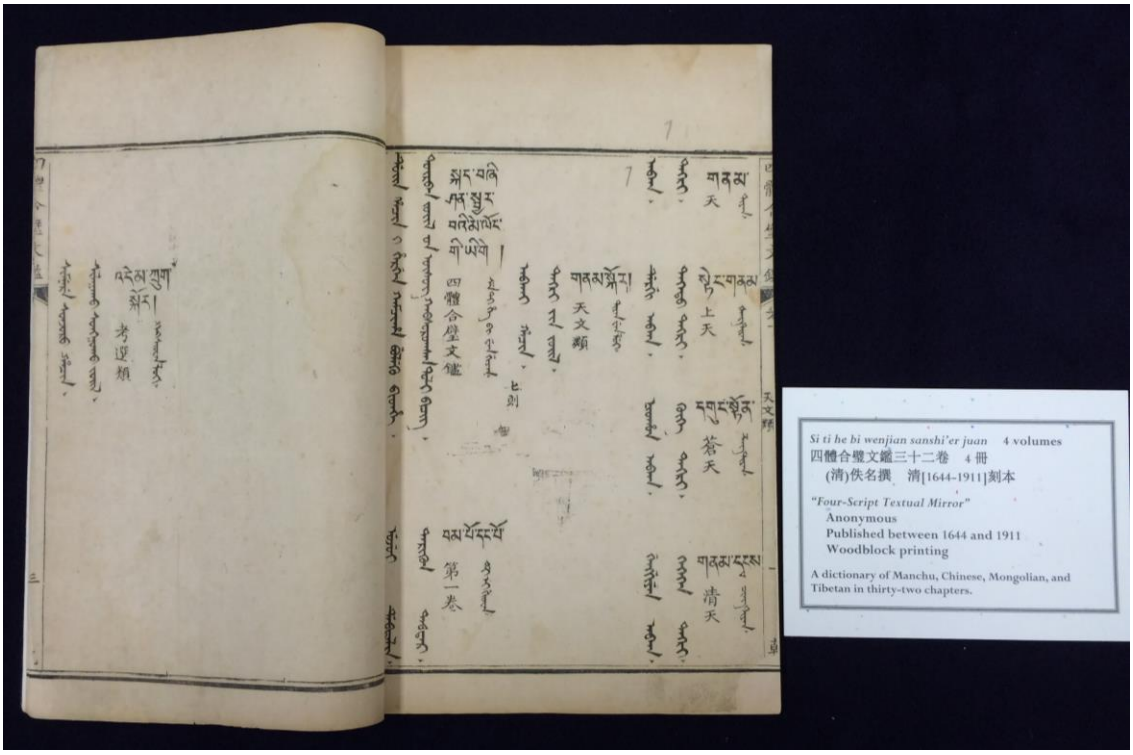


Figure 6. *Four-Script Textual Mirror*. A dictionary of Manchu, Mongolian, Chinese, and Tibetan.

The second scenario is about a Chinese rare book with unusual volume numbers. There are five volumes in a book set, and the volume numbers are First, Spring, Summer, Autumn, and Winter. This is a non-typical numbering system. While users may be able to interpret the sequence, catalogers need guidelines or best practices to record description consistently. This case is relevant to another more commonly used Chinese numbering system: Top (上), Middle (中), and Bottom (下) as volume 1, 2, and 3, or only volume Top and Bottom as volume 1 and 2. An example about this numbering system was described in the *Networks and Standardization* section in the *Levels of Standards and Standardization* chapter. In the 2016 CEAL (Council on East Asian Libraries)

cataloging workshop, librarians discussed the challenges of describing the Chinese, Japanese, and Korean numerals. Participants shared suggestions for best practices and voted for different options. The discussion focused on balancing the transcription principle and the ease of use. People had different opinions about how to record the original script, the Romanized form, and the Arabic numerals converted from the different numeral systems using the MARC format. When resource language differs from the language of description, many questions and the needs for guidelines and interpretation may arise.

Resource Context

Context is one other aspect of resources that may convey cultural influences. Some resources carry cultural meanings because of the historical, social, and cultural context they represent. In this section, I will present four examples observed in the fieldwork to support this observation. The first example is about a wooden-fish book collection dating from the Qing dynasty (1644-1911) to 1960. Wooden-fish books (Mu yu shu 木魚書) refer to books of a specific genre. The wooden-fish books are lyrics books of wooden-fish songs (Mu yu ge 木魚歌), which is a type of traditional Chinese performance art called Quyi (曲藝). The wooden-fish songs are performed in the forms of folk songs and narrative songs. It was popular in Hong Kong and the Guangdong Province in China in the 19th and early 20th century, but declined due to political and cultural changes at the time. Since the songs were performed by women as well, the lyrics books were precious evidence and materials for studying female literacy at the time. Wooden-fish book collections are not only rare but also important due to their cultural significance in reflecting a particular social and cultural context.

The second example is about calligraphy fonts and their connections to the social and economic context. In one observation session, Z showed some photos of Chinese rare books. He introduced the characteristics of different calligraphy fonts, and how the fonts reflect the context at the time. One photo was of the *Collected Works of Yan Zhenqing* (Yan Lugong wen ji. 顏魯公文集). The work was published in 1589 in the Ming dynasty. The font shows a transition from the handwritten font with soft edges to the printing font with sharp edges. This transition happened during the reign of the Jiajing emperor (嘉靖 1522-1566), when the political situation was stable, and the economy grew. In this prosperous era, many publications were published, which induced the emergence of the printing font. The second photo was *Chen Jiru's Notes* (Meigong bi ji. 眉公筆記), which was published in the reign of the Wanli emperor (1573-1640) in Ming dynasty. During this time, the print font was more mature, and even more established than the Qing dynasty (1644-1912) afterwards. The third photo was *A Collection of Weizhai* (Weizhai ji. 韋齋集), which was published in 1710 in the Qing dynasty. Through the photo, we can see the softness and curves in the fonts. These characteristics reflect the Manchu people's admiration of the Han culture at the time. Manchu people were originally from the North. They took over the Southern regime and ruled the Chinese empire as the Qing dynasty for more than 200 years. The Han people referred to people living around the Yellow River basin area. With established agricultural activities and intellectual development, the Han people contributed to the development of the Chinese culture at the time. Knowing the historical and cultural context, and the contrast between the North and the South at the time, I could understand Z's interpretation of the fonts. However, without Z pointing out the connections and explaining the relevant context, it would be difficult for users to capture the cultural meanings embedded in the calligraphy fonts.

The third example contains three rubbings. The first rubbing is *the Record on Reconstruction of the Mosque*. (*Chong jian qing zhen si ji.* 重建清真寺記). The stele was engraved in 1489, and the rubbing was created between 1911 and 1949. The second rubbing is *the History of the Daojing Temple* (*Zun Chong Dao Jing Si Ji.* 尊崇道經寺記). The stele was engraved in 1512, and the rubbing was created between 1875 and 1911. The third rubbing is the *Temple History Stone* (*Ci tang shu gu bei ji*. 祠堂述古碑記). The stele was engraved in 1679, and the rubbing was created between 1875 and 1911. While the three rubbings and the steles were created and engraved in different times, they are important evidence of religious freedom at the time. The content shows that people had the freedom to choose their religions. Currently, all three stone steles are in the Kaifeng Museum in China. For users who cannot travel for the steles, accessing the rubbings is an alternative to understanding the development of religions in China between 1489 and 1679.

The fourth example is about an author, Fan, Zengxiang (1846-1931), and his 52 names. In a cataloging scenario, Q described a work titled *Fanshan hua ji shi wen ji* (*A Collection of Fanshan's Humorous Poems and Essays.* 樊山滑稽詩文集). The work consists of two volumes, titled *Fanshan hua ji shi wen chu bian* (*The First Compilation of Fanshan's Humorous Poems and Essays.* 樊山滑稽詩文初編) and *Fanshan hua ji shi wen xu bian* (*The Continual Compilation of Fanshan's Humorous Poems and Essays.* 樊山滑稽詩文續編). In this case, "the first" compilation and "the continual" compilation map to volume 1 and volume 2, but without context, the volume number for "the continual" compilation might be ambiguous. A novel titled *Qin lou meng* (琴樓夢) is included at the end of the second volume. Upon examination, Q found three title variations in the two volumes. She followed the ranked title sources in CGCRB, and recorded title

information with specifications of the title sources in the note field. However, the complexity of this work did not stop here. After examination, Q found multiple author names in the books. In the caption, we see *Dongxijushi zhu* (Written by Dongxijushi. 東溪居士著). In the colophon, we see *Yuan zhu: Shenyunjushi* (Originally written by Shenyunjushi. 原著: 身雲居士). In other places of the books, we found three other names, *Fanshan xian sheng* (樊山先生), *Fan Zengxiang* (樊增祥), and *Fan Fanshan* (樊樊山). Q suspected that some or maybe all of the names refer to the same person. Q tried to know about this author online but failed to find much information. In the end, Q found a page of name authority files created by the Institute of History and Philosophy in the Academia Sinica in Taiwan. Based on that authority record, Q not only confirmed that the five names listed above all refer to the same person, but also found that this author has 52 names, and most of the names were self-assigned. To our relief, the author did not use all the 52 names for publication, so Q only had to add the names that appear in the books to the author's LC name authority record. The 52 names cover different cultural name types. Fan Zengxiang is the author's given name, while other names are likely pseudonyms, such as art names and courtesy names. Art names may reflect a person's domain of expertise, or relate to one's study name. For example, *Fan Zengxiang* is also known as *Shenyunjushi* (身雲居士), because his study is *Shenyun ge* (身雲閣). Referring to him by *Shenyunjushi* is like calling him "the owner of the *Shenyun ge* study." Some authors have religious names like Dharma name and baptized name, and some have genealogical name (譜名). The variant name types and the tradition of having multiple names reflect the cultural and historical context of an author's time.

8. Operationalize Cultural Warrant in Knowledge Organization

Based on the analyses presented in the previous chapters, I collected manifestations of cultural warrant from the design of three knowledge organization standards and cataloging practices. These manifestations are examples of cultural warrant that were observed in the knowledge organization process. In this chapter, I will use the *Knowledge Organization Process* codes in the codebook as the structure to present the observed manifestations of culture. There are some SEE and SEE ALSO references in the list. The SEE references in italics function as place holders that link to the content at a different part of the list. Following the structure, we will have a clear view of what to examine for cultural influences in each of the key components of the knowledge organization process. This list will serve as a checklist for scholars, practitioners, and managers to identify and evaluate cultural influences in a knowledge organization process. The list is an analytical tool to identify the variant sources and aspects of cultural influences, and further examine how these influences manifest in knowledge organization. It provides an operationalization of cultural warrant in knowledge organization. With this list, we can answer questions like "How do we account for cultures in knowledge organization?", "Where do we look for evidence of culture in knowledge organization?", and "How to evaluate which culture(s) are taken into account in a knowledge organization process?" One potential application of this list is to develop a survey for evaluation purposes. For instance, based on *1.1. Geography*, we can generate a survey question like: Examine the resources being described in the knowledge organization process, is there a specific geographic focus?

1. RESOURCES
   Scope note: The things being described and/or organized in a knowledge organization process. We can examine and trace the following aspects of resources for cultural influences.

   1.1. Geography
   Example: CGCRB describes Chinese rare books published in China.

   1.2. Time
   Example: Name types like art name (號) are common in imperial China.
   Example: CGCRB defines rare books as books published before 1796.

   1.3. Language
   Example: Some Chinese, Japanese, and Korean materials use language-specific numeral representations, such as using Spring, Summer, Autumn, and Winter for 1, 2, 3, and 4.
   Example: A dictionary written in Manchu, Mongolian, Chinese and Tibetan.

   1.4. Content/Subject
   Example: AAT focuses on art, architecture, and material culture.
   Example: Calligraphy fonts reveal historical, economic, and cultural contexts.
   Example: The three rubbings that are evidence of religious freedom.
   Example: The wooden-fish book collection as evidence of female literacy education in the late Ming and Qing dynasties.

   1.5. Format/Genre

      1.5.1. Resource types that have cultural meanings
      Example: *Goshinsen* (御神籤) is a Japanese fortune telling kit.
      Example: Seals are often used as formal signatures in the Asian context.

      1.5.2. Resource types with culturally specific carrier
      Example: Rubbings
      Example: *Wahon* (和本) are books using Japanese papers and Japanese book binding methods.
      Example: Bamboo slips

      1.5.3. Culturally specific genres
      Examples: *Ci* (詞), *Bi ji xiao shuo* (筆記小說), and *Yuefu* (樂府) are Chinese literary genres.

1.5.4. Genres that have cultural nuances
Example: Cultural perspectives on Chinese novels influence the availability of authors' information.

2. AGENTS
Scope note: Individuals or groups of people who design knowledge organization standards, organize knowledge, create resource descriptions, or consume resource descriptions as users.

2.1. The Expertise of an Individual (Information Professional/User)

2.1.1. Cultural literacy to understand resource context
Example: A cataloger's ability to distinguish Nō plays from musicals.

2.1.2. Subject expertise to make judgements and inferences about resources
Example: The expertise to estimate the creation year of a rubbing.

2.1.3. Language skills to understand resource content and expand available reference sources
Example: Q referenced both English and Chinese reference resources to suggest the preferred form of *Sichuanese*.

2.1.4. Familiarity with KO standards
Example: Know that there may be more than one sanctioned option in RDA for selecting the preferred names for people with a title of nobility.
Example: Know what brackets mean in cataloging records.

2.2. The Communities an Individual Relates to

2.2.1. Practices
Examples: Prioritization and application of principles and warrants.

2.2.2. Trust
Example: Select records created by trustworthy institutions for copy-cataloging.

2.3. The Developer/Editor/Editorial Committee that Designs a Standard
Examples: The Library of Congress is the developer of LCSH.

2.3.1. Practices
Examples: Prioritization of warrants, interpretations of concepts, and approaches to address issues.

2.4. Users' Needs
Example: The culture(s) and preferred language(s) of the intended users and actual users.

2.5. Local Library's Context and Missions

2.6. Author/Contributor

2.6.1. The meanings of authorship and the roles of contributors
Example: Who qualifies as an author/creator?

2.6.2. Cultural name types
Example: Courtesy name and art name.

2.7. Key Stakeholders
Example: OCLC is a critical gatekeeper, since some metadata in WorldCat can only be corrected by OCLC.

2.8. Providers
Example: Database vendors influence the quality of vendor-provided metadata and the technical features/limitations of a database.

2.9. The Population being Described
Example: Demographic groups described in LCDGT.

3. STANDARDS, PRACTICES, AND PRINCIPLES
Scope note: The knowledge organization rules applied in the knowledge organization process. Some examples are classification schemes, metadata standards, cataloging rules, best practices, traditions, principles, workflows, standardized procedures, and guidelines. The rules are of variant levels of scales and scopes.

3.1. Context of Development

3.1.1. *Developers/Editors/Editorial committee* (*SEE 2.3*)

3.1.2. Intended purposes and objectives

3.1.3. *Intended users (SEE 2.1 and 2.4)*

3.1.4. Intended resources
Example: The default resource language influences the design of MARC 8 and the Cutter Table.
Example: CGCRB has a specific default resource type.

3.1.5. Origination Time
Example: The LCC has been established since the late 19th century.

Example: The catalog of the *Complete Library in Four Sections* (*Siku quanshu*) was developed between 1773 and 1792, in the Qing dynasty in China.

3.2. Design

3.2.1. Structural design
Example: NDC includes indexes for systematic arrangement.
Example: The sequence of main classes in CCL is based on traditional Chinese classifications.

3.2.2. Notational design
Example: Class names, notation labeling, and mnemonic devices.

3.2.3. Sanctioned information sources
Example: the ranked title sources in CGCRB.

3.2.4. Level of specificity
Example: In LCGFT, there are more specific terms for English literature than for Chinese literature.
Example: AAT has more specific art related vocabularies than LCSH.

3.3. Foundations

3.3.1. Theoretical foundations
Example: The principles of library catalogs.
Example: Conceptual models like FRBR, FRAD, and FRSAD.

3.3.2. Existing standards (standards that are referenced for the design of a standard)
Example: Catalogs, schemes, naming conventions, traditions, guidelines, and principles.

3.3.2.1. breakdowns of existing standards. (*SEE ALSO 3.1.2.)*

3.3.3. Literature
Example: Mori referenced journal articles for localization approaches in NDC.

3.3.4. Assumptions/Expectations
Example: The meaning of authorship.
Example: Bibliocentrism.
Example: CGCRB only requires Chinese notes, which assumes that users have the Chinese language skill.

3.4. Levels of Standards and Standardization

3.4.1. Application scale

3.4.1.1. institutional level
Example: UW Libraries

3.4.1.2. community level
Example: East Asia Libraries in the U.S.

3.4.1.3. national level
Example: U.S. libraries

3.4.1.4. international level
Example: libraries that use RDA

3.4.2. Network (any focus on resource types or domains)
Example: The SUMMIT consortium
Example: The PCC program

4. ACTIONS
Scope note: The actions of knowledge organization, including cataloging, classifying, and describing.

4.1. Cataloging/Describing Resources

4.1.1. Bibliographic verification. Decide to do copy cataloging, adapt existing records, or do original cataloging.

4.1.2. Reference existing bibliographic or authority records for various components.
Example: Reference class numbers, subject headings, title information, term definitions, descriptive template of a particular resource type, publication information, or preferred name.

4.1.3. Consult reference resources
Example: Consult literature in different languages, Wikipedia, or established metadata.

4.1.4. Make inferences
Example: Cataloger infers an author's identity from the study name.

4.1.5. Come up with and implement workarounds
Example: Use uncommon reference resources to find author information.

Example: Use synonyms to replace a Chinese character that cannot be displayed due to the limitation of the encoding standard.

4.1.6. Resistance
Example: Deliberately omit particular author information for privacy and ethical concerns.

4.2. Proposal of Changes. As a form of resistance, catalogers can propose changes to KO standards.
Example: Propose new controlled vocabularies like *Zhiqing* (LCSH) and *Ci* (LCGFT).
Example: Propose an expansion of resource scope of CGCRB.
Example: Propose a change of preferred term, like *illegal aliens* (LCSH).

5. DESCRIPTIONS
Scope note: Knowledge organization deliverables, such as cataloging records and metadata.

5.1. Language of descriptions. Often influenced by intended users and the local context. (*SEE ALSO 2.1 and 2.5.)*
Example: Mnemonic characters in notations.
Example: The language of the preferred form of a descriptor.
Example: The language of devised titles.

5.2. Format

5.2.1. Components of resource description
Example: In CALIS practices, it is encouraged to pair bibliographic records with scan images.

5.2.2. Symbols and punctuations used in resource descriptions
Example: Brackets.

5.3. Unit of Description
Example: The unit of description for series depends on the completeness of the local collection.
Example: The unit of description for rubbings differ between RDA and the CALIS practice.

5.4. Ways of Describing Resources *(SEE ALSO 3.3 and 4.1.5)*
Example: Come up with and implement workarounds.
Example: Assign titles based on one's subject expertise.

5.5. Objectives of Resource Descriptions *(SEE ALSO 3.1.2. and 3.3.1)*

5.6. Descriptors (controlled vocabularies) (SEE 3.)

5.7. Description Content *(SEE ALSO 2.2)*
Example: Provide value-embedded descriptions vs. practice the transcription principle.

6. KNOWLEDGE ORGANIZATION INFLUENCES
Scope note: The influences knowledge organization standards and descriptions have on people.

6.1. Global-local Tensions

6.1.1. Users *(SEE ALSO 2.4)*
Example: The intended users of a standard may differ from the local users.
Example: Representativeness of different user groups in KO standards and resource descriptions.

6.1.2. Resources (SEE 1.)

6.1.3. Adaptation as a Form of Resistance
Example: CCL and NDC adapted established standards for local needs.

6.1.4. Proposal of Changes (SEE 4.2)

6.2. Political Influences
Example: Multiple Chinese Romanization standards co-exist.

6.3. Ethical Influences

6.3.1. Data Representation (SEE 4.1.6)

6.4. Access Influences

6.4.1. Inconsistent descriptions *(SEE ALSO 4.1.5)*
Example: Without indexes, catalogers may apply the same scheme differently and provide inconsistent descriptions.

6.4.2. Language/Script challenges *(SEE ALSO 4.1.5)*
Example: Display issues of some non-Roman scripts due to the limitations of encoding schemes, like MARC 8.

6.4.3. The lack of specific descriptions *(SEE ALSO 4.2)*
Example: Lacking Chinese genre/form terms like *Ci* resulted in general resource descriptions (e.g., Chinese literature) and imprecise information retrieval and access.

6.4.4. Adding or lacking access points *(SEE ALSO 4.2)*
Example: Catalogers can record non-Latin script information, such as title and personal name, as added entries (i.e., additional access points) to improve information retrieval and access.

9. Conclusion

In this dissertation, I operationalize the concept of cultural warrant in knowledge organization through three approaches, which answer three research questions. The first research question is: **How is culture identified in the knowledge organization literature?** To answer this question, I presented a literature review of the concept of *culture* in the knowledge organization literature, and supplemented it with anthropology literature and sociology literature. Through literature review, I identified families of definitions of culture, which are: culture as contexts, culture as collective phenomenon, and culture as the human-made part of environment. Besides reviewing the definitions, I collected the components, manifestations, and characteristics of culture from the literature. These descriptions of culture complement the families of definitions of culture, and contribute to my working definition of culture in the knowledge organization context. For my purposes, culture is a cognitive framework constructed by a community. The framework influences how people within the community perceive the world. Culture is learned, dynamic, and co-existing. The literature review presents an answer to the first research question.

Based on the understanding of the concept of culture in the knowledge organization context, we have the foundation to further inquire about the concept of **cultural warrant**. I reviewed the meaning and usages of cultural warrant, and pointed out the need to operationalize this concept. Also, I argued for expanding the scope of cultural warrant from classificatory decisions to the knowledge organization process, which includes several components: resources, agents, knowledge organization actions, standards, practices, and principles, descriptions, and knowledge organization influences. Culture influences all components of the knowledge organization process, and the influences between these components are intertwined. Through expanding the scope of

cultural warrant, we can gain a more comprehensive understanding of cultural influences in the knowledge organization process in general.

The second research question is: **How is culture manifested in knowledge organization standards?** To answer this question, I did case studies of three knowledge organization standards: the first edition of CCL (the New Classification Scheme for Chinese Libraries), the first edition of NDC (Nippon Decimal Classification), and RDA (Resource Description and Access). CCL is a classification scheme in Taiwan. NDC is a classification scheme in Japan. The first editions of both CCL and NDC were published in 1929. RDA is an international cataloging guideline that succeeds the AACR2. I selected the three standards to diversify the cases in several aspects, which are types of resources described, language, publication time, type of standard, the perspective represented in the global-local tension, and the connections with the cataloging practices observed in the fieldwork. Instead of focusing on the schemes and the cataloging rules, I analyzed the editorial documents of the standards, such as the preface, introduction, and purpose statements. Through the analysis, I was able to answer the research question by capturing manifestations of culture that were designed and intentionally embedded in the standards through the editors' lens.

There are some limitations of these case studies. With limited cases, the three standards only cover two types of knowledge organization standards (i.e., classification scheme and cataloging guidelines), and these standards are more relevant in the library communities. There are other types of knowledge organization standard (e.g., thesaurus, metadata schema) for more diverse resource types and user groups. For future research, we can examine other standards, such as CCO (Cataloging Cultural Objects), CIDOC CRM (Comité International pour la Documentation

Conceptual Reference Model), AAT (Art and Architecture Thesaurus) and AAT-Taiwan[7], Dublin Core and its localization in Taiwan's NCL (National Central Library) digitization project, and Dewey Decimal Classification (DDC) and its translations.

The third research question is: **How is culture manifested in cataloging practices?** To answer this question, I took an ethnographic approach. Through ethnographic fieldwork, I observed catalogers Q, Z, and their colleagues' work at an academic library in the U.S. During a one-year period, I accumulated 43 fieldnotes of thick descriptions of cataloging practices. The fieldnotes document how the catalogers use knowledge organization standards of different levels to describe resources in many formats, genres, languages, and time.

This ethnographic study has its limitations. The cataloging scenarios reflect the characteristics of the local collection, which emphasizes East Asian resources, in the context of a U.S. academic library. As a result, not all observations and implications apply to other communities. For instance, the descriptions of indigenous resources and Southeastern Asian resources may share some common needs (e.g., the perspective of the local-side in the global-local tension) but have unique considerations. For future work, I can expand the analysis to other fieldnotes of the same ethnographic project to include other field sites.

To analyze the editorial documents of the three knowledge organization standards and the fieldnotes, I did qualitative coding using Atlas.ti. The codebook includes three groups of codes,

[7] AAT-Taiwan was a project that translated AAT to traditional Chinese (i.e., AAT-Taiwan). This project also added Chinese art vocabularies to both AAT and AAT-Taiwan (Chen & Chen, 2015).

which are (1) conceptual tools, (2) knowledge organization process, and (3) warrants. Through qualitative coding, I identified common themes in both the editorial documents of the standards and the fieldnotes. These themes answer the second and the third research questions, and they are the key findings of this dissertation: conflicts and prioritization of warrants, levels of standards and standardization, resistance, and resources being cultural.

In the ***Conflicts and prioritization of warrants*** chapter, several examples showcase how multiple warrants influence the knowledge organization process collectively. Through exploring the reasons behind the conflicts, differences, and prioritization of warrants, I identify cultural influences and manifestations of cultural warrant in the knowledge organization process. In the ***Levels of standards and standardization*** chapter, I investigated the three knowledge organization standards, and presented how multiple standards, practices, and principles can influence the creation and development of a standard through conveying cultural influences and perspectives. In order to examine the levels of standards and standardization in cataloging practices, I went through knowledge organization standards that were applied in the fieldwork, including controlled vocabularies like LCSH and AAT, conceptual models like FRBR, and unique identifiers, such as ORCID ID. These standards intertwine and shape resource descriptions together. In the fieldwork, I also observed individual catalogers' actions to account for standard warrant and standardization warrant. Recognizing the levels of standards and standardization in the knowledge organization process, I tested and applied five categories of levels of standards and standardization. The categories are institutional level, community level, national level, international level, and network level. In addition, I highlighted a set of critical elements of knowledge organization standards to help identify the sources of cultural influences. With these analytical tools to sort out the complex

mix of standards, I further discussed how knowledge organization standards can be cultural. Using CGCRB, AAT, BIBFRAME and RIMMF, and the Cutter Table as examples, I presented different manifestations of cultural influences in knowledge organization standards, including resource scope, the perspectives and domains represented, intended users, the default languages and scripts, and the prioritization of metadata that is imposed by structural limitations. When standards, which bring in cultural influences respectively, differ or conflict with one another, the knowledge organization process becomes even more complex.

In the ***Resistance*** chapter, we see examples showcasing different types of resistance. The forms of resistance in the three knowledge organization standards include: resistance as a reaction to the breakdown of existing infrastructures, and resistance as a response to the global-local tension in knowledge organization standards. The expressions of resistance observed in the fieldwork include (1) the conflicts of and resistance to cataloging principles, traditions, or standards, (2) workarounds, (3) proposal or application of changes to standards or resource descriptions, and (4) intentional omission. It takes effort and cost to resist. Resistance, if culturally motivated, is a sign of cultural warrant competed against, and even prioritized over other warrants. The culturally motivated resistance points us to manifestations of cultural warrant in knowledge organization. In the ***Resources being cultural*** chapter, we see resources, as a source of cultural influences, can extend the influences on other components in the knowledge organization process. Resources can be cultural in many ways. Some prominent aspects are format and genre, subject and content, resource language, and resource context.

In previous studies, scholars recognize cultural influences in knowledge organization, and use *cultural warrant* as an approach to actively take culture into account in classificatory decisions (Beghtol, 1986). Through observing the application of cultural warrant in the knowledge organization literature, we see variant boundaries of culture, such as nation, religion, and language (Taheri et al., 2014). Without operationalization, scholars lack a framework to specify the aspects of culture under discussion, which undermines communication. To operationalize cultural warrant, I used the components of the knowledge organization process as the main structure, and compiled my findings as a structured list of manifestations of culture. This list is supported by literature review, case studies of three knowledge organization standards, and cataloging practices captured through ethnographic fieldwork. Following this list, we gain a better idea of where and what to examine for traces of cultural influences and manifestations of cultural warrant in the key components of the knowledge organization process. This deliverable provides a structure to examine the different components in the knowledge organization process. The examples highlight prominent sources of cultural influences, which can be manifestations of cultural warrant if information professionals identify and account for these influences.

For future works, we can expand the study toward at least three directions. First, we can expand the resource types observed. The *Resources being Cultural* chapter investigates four aspects of resource and how culture may influence these aspects. While I presented analysis based on observations of many resource formats in the knowledge organization standards and cataloging scenarios in the field, there are more resource types we can explore in future work. For instance, we can analyze resources in digital humanities projects and Wikidata projects. Through studying more resource types, we can expand our understanding about other aspects of resources, including

properties and structures, and how these aspects relate to culture. The expansion will help us gain insights into cultural influences in resources, which is an indispensable component of the knowledge organization process. One other direction is to apply different research methods. This study uses case studies and ethnographic observations. While ethnographic observations can capture behind-the-scenes scenarios and details that other methods may not be able to present, future work can expand on the findings of this study, and use different methods to investigate culture and knowledge organization from different angles. The third direction is to look into the connections between warrants and epistemological stances. In previous studies, Bullard (2017) maps warrants to philosophies and epistemologies. For instance, literary warrant and the document-centered approach is mapped to empiricism, and scientific/consensus warrant is mapped rationalism. Barité (2019) connects warrants with epistemologies. The link between warrants and epistemological stances is established through the argument that knowledge can be organized in different ways, which reflects different perspectives. The different perspectives include epistemological perspectives and practical perspectives. These perspectives can be supported by types of warrant. While warrants may support epistemological perspectives, warrants may support other perspectives as well. Through collecting examples from knowledge organization standards and cataloging practices, future studies may expand on this topic and explore the relationship between warrants and epistemologies.

Appendix I. Code Co-occurrences

The tables show co-occurrence frequencies of all codes. The code notations are consistent with the codebook in the Methodology section.

	A.1.	A.2.	A.3.	A.4.	A.5.	A.6.	B.1.	B.2.	B.3.	B.4.	B.5.	B.6.
A.1.	50	4	7	0	9	4	2	11	18	2	15	18
A.2.	4	53	10	1	7	6	1	6	2	0	11	15
A.3.	7	10	77	7	6	3	3	25	11	5	28	13
A.4.	0	1	7	19	3	1	0	8	3	1	7	6
A.5.	9	7	6	3	31	5	0	5	4	2	19	7
A.6.	4	6	3	1	5	73	3	8	26	6	18	17
B.1.	2	1	3	0	0	3	24	5	4	1	6	8
B.2.	11	6	25	8	5	8	5	136	48	9	15	59
B.3.	18	2	11	3	4	26	4	48	288	34	18	85
B.4.	2	0	5	1	2	6	1	9	34	46	1	22
B.5.	15	11	28	7	19	18	6	15	18	1	95	24
B.6.	18	15	13	6	7	17	8	59	85	22	24	200
C.1.	1	4	6	9	2	0	0	3	1	1	7	4
C.2.	4	0	0	0	0	2	0	2	10	2	0	4
C.3.	10	4	2	0	1	0	0	8	20	2	5	19
C.4.	0	0	2	0	1	0	0	5	27	2	1	5
C.5.	7	0	1	0	0	1	1	1	3	0	1	3
C.6.	0	1	2	0	0	0	1	8	29	5	4	10
C.7.	2	0	2	0	0	1	0	5	2	1	3	5
C.8.	0	0	1	0	0	0	0	1	2	0	0	0
C.9.	10	2	3	0	0	3	1	5	9	2	2	9
C.10.	8	6	8	1	15	16	1	13	58	16	20	35
C.11.	2	1	6	1	2	8	2	4	22	4	9	9
C.11.1.	0	0	0	0	0	0	0	1	6	1	0	3
C.12.	9	4	2	2	4	4	0	7	19	1	6	9
C.12.1.	5	1	2	0	1	5	0	2	23	16	1	13
C.12.2.	1	0	0	0	0	6	1	4	30	1	0	8
C.12.3.	4	7	4	0	8	14	3	5	26	4	15	15
C.13.	5	1	6	2	2	7	1	17	80	10	17	37
C.13.1.	1	3	2	0	5	7	5	2	14	1	19	18
C.13.2.	4	3	9	1	2	10	5	12	56	5	28	29
C.14.	0	0	2	0	0	2	0	2	15	4	0	10
C.15.	8	42	13	2	8	8	0	20	50	9	12	37
C.16.	13	4	11	2	5	11	2	19	39	13	11	32
C.17.	1	7	1	0	2	5	0	1	1	1	4	2
C.18.	5	6	10	7	3	7	1	9	22	6	20	26
C.19.	27	7	8	0	7	12	1	18	32	2	12	24

Table 9. Code Co-occurrences Table 1

	C.1.	C.2.	C.3.	C.4.	C.5.	C.6.	C.7.	C.8.	C.9.	C.10.	C.11.	C.11.1.
A.1.	1	4	10	0	7	0	2	0	10	8	2	0
A.2.	4	0	4	0	0	1	0	0	2	6	1	0
A.3.	6	0	2	2	1	2	2	1	3	8	6	0
A.4.	9	0	0	0	0	0	0	0	0	1	1	0
A.5.	2	0	1	1	0	0	0	0	0	15	2	0
A.6.	0	2	0	0	1	0	1	0	3	16	8	0
B.1.	0	0	0	0	1	1	0	0	1	1	2	0
B.2.	3	2	8	5	1	8	5	1	5	13	4	1
B.3.	1	10	20	27	3	29	2	2	9	58	22	6
B.4.	1	2	2	2	0	5	1	0	2	16	4	1
B.5.	7	0	5	1	1	4	3	0	2	20	9	0
B.6.	4	4	19	5	3	10	5	0	9	35	9	3
C.1.	18	0	0	0	1	0	0	0	0	1	1	0
C.2.	0	21	2	0	0	2	0	0	0	5	6	0
C.3.	0	2	33	3	0	0	0	0	5	3	2	0
C.4.	0	0	3	29	0	3	1	2	0	2	5	0
C.5.	1	0	0	0	17	0	0	0	1	1	0	0
C.6.	0	2	0	3	0	38	1	0	0	17	6	0
C.7.	0	0	0	1	0	1	14	0	0	5	0	0
C.8.	0	0	0	2	0	0	0	2	0	0	0	0
C.9.	0	0	5	0	1	0	0	0	18	2	0	0
C.10.	1	5	3	2	1	17	5	0	2	98	7	1
C.11.	1	6	2	5	0	6	0	0	0	7	42	2
C.11.1.	0	0	0	0	0	0	0	0	0	1	2	6
C.12.	1	1	4	0	1	2	1	0	1	4	3	0
C.12.1.	1	1	4	1	0	2	0	0	3	8	4	0
C.12.2.	0	1	2	7	0	2	0	0	1	2	2	0
C.12.3.	0	1	3	6	1	2	2	0	0	14	3	4
C.13.	1	6	6	9	0	9	2	1	2	18	18	2
C.13.1.	1	0	2	2	0	1	2	0	0	8	0	0
C.13.2.	2	1	1	2	1	4	4	0	1	12	5	1
C.14.	0	0	0	0	1	2	0	0	1	0	0	0
C.15.	4	4	10	6	2	6	1	0	6	18	2	2
C.16.	0	5	11	4	1	0	1	0	6	14	4	2
C.17.	0	0	0	0	1	0	0	0	1	1	0	0
C.18.	8	2	2	0	0	4	6	0	1	9	4	2
C.19.	2	3	10	0	6	3	4	0	5	16	9	0

Table 10. Code Co-occurrences Table 2

	C.12.	C.12.1.	C.12.2.	C.12.3.	C.13.	C.13.1.	C.13.2.	C.14.	C.15.	C.16.	C.17.	C.18	C.19.
A.1.	9	5	1	4	5	1	4	0	8	13	1	5	27
A.2.	4	1	0	7	1	3	3	0	42	4	7	6	7
A.3.	2	2	0	4	6	2	9	2	13	11	1	10	8
A.4.	2	0	0	0	2	0	1	0	2	2	0	7	0
A.5.	4	1	0	8	2	5	2	0	8	5	2	3	7
A.6.	4	5	6	14	7	7	10	2	8	11	5	7	12
B.1.	0	0	1	3	1	5	5	0	0	2	0	1	1
B.2.	7	2	4	5	17	2	12	2	20	19	1	9	18
B.3.	19	23	30	26	80	14	56	15	50	39	1	22	32
B.4.	1	16	1	4	10	1	5	4	9	13	1	6	2
B.5.	6	1	0	15	17	19	28	0	12	11	4	20	12
B.6.	9	13	8	15	37	18	29	10	37	32	2	26	24
C.1.	1	1	0	0	1	1	2	0	4	0	0	8	2
C.2.	1	1	1	1	6	0	1	0	4	5	0	2	3
C.3.	4	4	2	3	6	2	1	0	10	11	0	2	10
C.4.	0	1	7	6	9	2	2	0	6	4	0	0	0
C.5.	1	0	0	1	0	0	1	1	2	1	1	0	6
C.6.	2	2	2	2	9	1	4	2	6	0	0	4	3
C.7.	1	0	0	2	2	2	4	0	1	1	0	6	4
C.8.	0	0	0	0	1	0	0	0	0	0	0	0	0
C.9.	1	3	1	0	2	0	1	1	6	6	1	1	5
C.10.	4	8	2	14	18	8	12	0	18	14	1	9	16
C.11.	3	4	2	3	18	0	5	0	2	4	0	4	9
C.11.1.	0	0	0	4	2	0	1	0	2	2	0	2	0
C.12.	39	4	3	8	4	1	4	0	11	2	0	7	14
C.12.1.	4	30	2	1	6	0	6	4	5	4	0	3	9
C.12.2.	3	2	32	5	8	1	3	1	4	3	0	3	2
C.12.3.	8	1	5	59	9	16	13	1	14	12	3	8	5
C.13.	4	6	8	9	107	5	34	3	12	10	0	21	13
C.13.1.	1	0	1	16	5	46	13	2	6	3	3	1	7
C.13.2.	4	6	3	13	34	13	94	2	5	2	0	14	9
C.14.	0	4	1	1	3	2	2	19	6	1	1	0	0
C.15.	11	5	4	14	12	6	5	6	110	20	8	11	14
C.16.	2	4	3	12	10	3	2	1	20	80	0	9	12
C.17.	0	0	0	3	0	3	0	1	8	0	15	0	2
C.18.	7	3	3	8	21	1	14	0	11	9	0	63	8
C.19.	14	9	2	5	13	7	9	0	14	12	2	8	80

Table 11. Code Co-occurrences Table 3

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