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Ethically Responsible Knowledge Organization Systems: Towards an Intercultural User Interface

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Abstract

Purpose/Thesis: This paper discusses the challenges of creating a theoretic framework within the context of an intercultural and ethically responsible knowledge organization system (KOS).

Approach/Methods: First, the paper explores ethical and societal concerns linked to the development of KOS. Second, it illustrates a way to tackle this ethical factor by proposing an applicable architecture for intercultural interfaces which respects cultural diversity on a global scale.

Results and conclusions: The author emphasizes the importance of opening up the notion of cultural inclusiveness, to weigh not only linguistic diversity but also other cultural and social aspects, such as geography, religious affiliations, tradition, historical elements, ethnic. This kind of approach should be attentive to intersectionality and cultural interoperability.

Originality/Value: By addressing local circumstances, the author offers insights into essential approaches that take into account cultural diversity when designing KOS and access interfaces to knowledge.

Keywords

Cultural interoperability. Cultural warrant. Ethical warrant. Knowledge organization. Knowledge organization system.

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1. Introduction

The development of digital libraries, digital collections, and multilingual resource portals has been pushing forward efforts on the pooling of scattered resources in order to offer them to the public. At the international level, cultural institutions have worked on the conditions of heritage works exchange for which they are responsible and on the metadata used for identifying and describing the works. The challenges of technical and semantic interoperability have been and continue to be at the heart of all online-content development projects (Favier & Mustafa El Hadi, 2013). Moreover, extending the concept of interoperability is what Papy (2015) suggested to understand both what makes access to shared resources possible and what makes them usable in a timely manner.

Since knowledge organization systems (KOS) are mechanisms for organizing information, they are at the core of libraries, archives, and museums (LAMs). The effective integration of KOS in digital environments would facilitate the integration of the vast corpora of recorded knowledge in heritage institutions and born-digital resources on the Web. Most efforts until recently are being put on the development of multilingual/multicultural systems and local

adaptations to feed those systems, but language is only one of the many aspects. There are other social aspects regarding some of the levels and sources of multiculturalism (Barát, 2008), or epistemological aspects such as the recognition of diversity as something inherent to KOS, and the recognition of the impact of human and social factors into knowledge organization (KO) activities (Guimarães, 2015).

This paper stems from results and the reflection during the designing phase of EKOS-Interface project, where the author works as a design engineer. The project aims to deal with two convergent themes: cultural interoperability and ethics in KO. The ultimate goal of EKOS-Interface is to provide an intercultural interface designed for knowledge discovery in multilingual and multicultural contexts by delivering full integration of KOS. The paper begins with examining the theoretical construction of ethical dimension in KOS. The primary purpose of this part is to tackle the issues of cultural interoperability in KO which can be briefly defined as “the degree to which knowledge and information is anchored to a unified model of meaning across cultures” (Vossen et al., 2010, 292).

The next part focuses on the creation and monitoring of ethically and globally accessible and culturally acceptable KOS. It is necessary to highlight the relevance of the works dedicated to conceptual foundation and theoretical construction of the cultural and ethical aspects that have been impacting the field (Olson, 2002; Beghtol, 2002a; 2005; García Gutiérrez, 2002; Hjørland, 2008; Campbell, 2009; Milani & Guimarães, 2011). In particular, the line of this research is linked to scholars who tried to integrate multiple knowledge representation systems or knowledge organization schemes and take into consideration the social and ethical dimensions of KO (Hudon, 1997; Green et al., 2002; Kublik et al., 2003; Mustafa El Hadi, 2015; López-Huertas, 2016).

2. Theoretical construction of ethically responsible KOS

2.1. *System heterogeneity and universality across KO schemes*

KOS covers all types of schemes and structures for organizing information and promoting knowledge management. They include not only classifications that organize materials at a general level and highly structured vocabularies such as thesauri but also “less traditional schemes, such as semantic networks and ontologies” (Hodge, 2000, 3). Due to that scope, one of the challenges we face in knowledge organization and representation is “heterogeneity of systems both at the level of expressions and structure of conceptual content” (Mustafa El Hadi, 2015, 577). Some theoretical conceptions of ethics in knowledge organization and representation can be highlighted to confront the challenges of promoting processes, tools, and products that are not tied to a given dominant ideology, and which respect the varied forms of knowledge (Green et al., 2002; García Gutiérrez, 2002; López-Huertas, 2016).

Olson (2002) suggested the ethical use of “the power to name”, as the representation of information itself presupposes a power which, making use of processes and tools that are not neutral but rather constructed and agreed upon, leads to constructing products that will act as a representation of the document or as a documentary surrogate. In this sense, although KOS can reflect the mainstream culture of society, they need to be

constantly opened to multiple cultural approaches to avoid exploitation, marginalization, and cultural imperialism.

Regarding the universality of human conceptual systems, one needs to deal first and foremost with human languages to tackle the issues of system heterogeneity. The multicultural dimension of multilingual KOS could be perceived in such a way to recognize the diverse underlying idiosyncratic views that are present in different semantic structures. Hudon (1997) noticed that languages are not only a set of words and rules put together; their conceptual and lexical structures also reflect the way their speakers see and interact with the world. She examined whether multilingual thesauri can act as tools that connect cultures and facilitate interlinguistic communication. Green et al. (2002) looked at a concept's hierarchical level and determined whether it can affect the likelihood of the universality across KO schemes.

2.2. Cultural hospitality as an ethical warrant

Culture is a collective and evolving construct. This concept describes the various phenomena that make up the collective beliefs and activities of a particular group of people. Discussions of culture refer to shared values, history, language, collective memory, social attitudes, preferences, and practices (Beghtol, 2002b). Today, the use of information and communications technology allows for more exchanges among people from a variety of linguistic and sociocultural contexts. Thanks to this cultural diversity, a new reality has developed in the form of cultural exchanges between people belonging to different collectives.

The benefits of cultural interoperability in KO are multiple. First of all, in an intercultural universe, cultural interoperability allows a specific system to integrate with the cultural environment of the other. Arboit and Guimarães (2015) emphasized, from a Bakhtinian perspective, the importance of intersubjective dialogue and responsive understanding in the way an individual interacts with others to “identify himself/herself with others and see the world through his/her own system of values” (Arboit & Guimarães, 2015, 326).

This dual concept permeated by dialogism is also beneficial for the elimination of harmful stereotypes caused by difference. Secondly, in the digital age, cultural interoperability allows one community to broaden its cultural knowledge as well as its skills developed in the interaction with others, regarding whether general knowledge (concepts, disciplinary knowledge, etc.), knowledge specific to the professional environment (management rules, organizational culture, etc.), procedural knowledge (methods, operating rules, procedures, etc.) or know-how which is knowledge updated by learned lessons. Thirdly, by respecting commitment, cultural interoperability reflects an experience of change, which is a process of transformation that involves all senses, knowledge, and behaviors (Al Sahyouni Bou Fadel, 2016).

Beghtol (2002b; 2005) introduced the concept of “cultural warrant” which allows the integration of information and knowledge across cultural, social, national, spatial, temporal, linguistic and domain boundaries, and promotes a “cultural hospitality” by means of KOS opened to incorporate new concepts and to establish appropriate semantic and syntactic relationships among the old and the new concepts. Furthermore, the problems of globalization for KOS can be approached by broadening the concept of hospitality, according to Beghtol (2002a). She argued that “new technologies have made the increased globalization

of information resources and services possible. In this situation, it is ethically and intellectually beneficial to protect cultural and information diversity” (Beghtol, 2002a, 507).

Relying on foundation principles for the ethical treatment of different cultures following the basis of the Universal Declaration of Human Rights, Beghtol (2002a) emphasized the need of building a global and local access to information in any language, available at any location at any time and for any purpose for any individual, culture, ethnic groups, or domain. For that reason, Beghtol concluded that the concept of “cultural hospitality” can act as a theoretical framework for the ethical warrant of KOS.

3. Approaches to cultural interoperability

3.1. *Community of practice*

Cultural diversity is a significant issue for many emerging communities of practice, and KO is not an exception. Etienne Wenger, a social learning theorist, hypothesized that the actors of the eco-construction met in the form of “community of practice” (CoP) (Wenger, 1998). The notion of CoP, according to Wenger, refers to all the social, information and communication practices put in place by groups or communities. Focusing on the processes of creating and sharing knowledge, Wenger distinguished three dimensions of CoP: the symbolic one that generates the feeling of belonging to a group and provokes mutual commitment; the cognitive one based on the sharing of available tools and resources by the whole community; and the social one that is responsible for the common work around a shared vision. These three dimensions relate to the concept of interoperability which, particularly in the field of information sciences, relies on the openness, sharing, adaptation, reconciliation of components, policies, and practices.

From this perspective, the tools and resources built in a CoP, which could be remobilized in various situations, allow the continuity and sustainability of the work activities for the actors within the domain. The use of adapted and stable means of communication contributes to the collective action and participates in mutual recognition among the actors. The characterization of their social practices thus depends on the relationship they establish with the new technologies (Soumagnac-Colin, 2016).

3.2. *Domain analysis*

Hjørland (1995; 2002) proposed hypotheses for a domain-analytic paradigm by dissecting its object of inquiry – the domain – which is something that has “a boundary, a specific terminology, basic unit concepts, terms, semantic relations, classification schemes and a shared ontology” (Mustafa El Hadi, 2015, 601).

Tennis (2003) developed Hjørland’s hypotheses by defining the two axes of domain analysis which are needed to consider when analyzing a domain:

Areas of Modulation must state 1) the totality of what is covered in the domain analysis – the extension and 2) what it is called – its name. The Degrees of Specialization must 1) qualify the domain – state its focus and 2) state where the domain is positioned against other domains – its intersection (Tennis, 2003, 194).

Domain analysis in its broad scope can be adapted to a general framework addressing cultural interpretability in KOS. Smiraglia (2012) extended domain analytical approach in KO. By using epistemological analysis, he observed that

the domain is best understood as a unit of analysis for the construction of a KOS. That is, domain is a group with an ontological base that reveals an underlying teleology, a set of common hypotheses, epistemological consensus on methodological approaches, and social semantics (Smiraglia 2012, 114).

Guimarães et al. (2015) proposed a domain analytical approach to identify theoretical referents and epistemic communities within a particular domain of the researchers that constitute a KO scientific community. On the practical level, Mustafa El Hadi (2015) proposed the use of reference tools such as terminologies and thesauri to retrieve the construction and sharing of meaning which refers to a “community of experts” or “discourse community”, while Guimarães et al. (2015) advocate the bibliometric methods.

3.3. Global/local knowledge organization

Smiraglia (2014) defined a synergistic era as one where “information is seen as a cultural action, information objects are cultural artifacts and cross-institutional information-sharing is a form of cultural synergy” (as cited in Smiraglia, 2015, 297).

Therefore, it requires resource description that is “synergistic, rather than bibliocentric” (Smiraglia, 2015, 297). Guimarães (2015) summarizes the main challenges of KOS in a world permeated by a tension between the global and the local approaches, including the “recognition of diversity as something inherent to KOS” and the recognition of KOS as “tools to promote a global dialogue” (8). These above-mentioned authors, when addressing KO’s cultural dimension, shared Olson’s (2002) vision that the challenge of facing marginalization can be solved by making limits permeable rather than redefining it or constructing a new limit, by making spaces, rather than filling them, and by addressing the relevant discourse in a given context.

Based on the assumption that context matters in any access to knowledge, Adler et al. (2016) proposed a global/local KO view to conceptualize the relationship between the universal and the particular. The tension between the “global” (Paul Otlet’s universalist vision) and the “local” (culturally anchored) remains a fundamental theme in classification, authority control, and links for expanding resource discovery from a local perspective to the global environment.

4. Towards an intercultural user interface

4.1. Applicable architecture

Language is one of the many aspects, such as age, geography, religious affiliations, tradition, historical elements, racial mix, gender, ideology, and other intangibles that reflect the levels and sources of multiculturalism. The overall vision of improving cultural interoperability is to enhance the accessibility of cultural heritage for the public, to pave the way for new digital humanities approaches, and to contribute to the various efforts to tame the information

flood. The EKOS-Interface project is expected to specify a high-level applicative architecture for intercultural interface design, which could serve as a model for local KOS, and their interoperability with global KOS (Fig. 1).

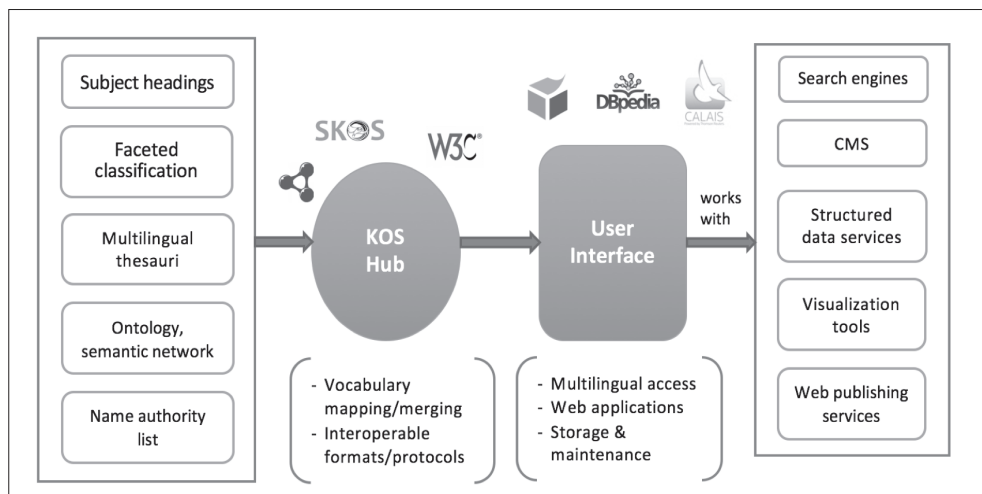


Fig. 1. Applicable architecture for intercultural interface

Barát (2008) listed four possible solutions to linguistic and cultural barriers in KO: the usage of multilingual thesauri, multilingual subject headings, the adaptation and usage of classification systems which are not based on language as the UDC, and machine translation or machine-aided translation. While the use of automatic translation or machine-aided translation in interfaces does not seem to be a feasible alternative yet, most efforts are being put on the development of multilingual/multicultural systems and local adaptations to feed those systems. This strategy is an increasingly vital element to ensure that access to information proceeds through any number of different portals, gateways, and search engines, many geared to particular audiences and subject areas.

EKOS-Interface is perceived and based on the observations of Aitchison & Dextre Clarke (2004), which indicate that, to achieve interoperability of systems, we must design our KO tools (vocabularies, thesaurus, etc.) for easy integration into downstream applications such as content management systems, indexing/meta-tagging interfaces, search engines, and portals. Also, the interface should be multilingual to support access to information resources in multiple languages and to facilitate cross-cultural communication in an increasingly global information society.

4.2. Building and testing the conceptual model

There are challenges involved in creating a user-friendly interface that will meet the needs of a global multilingual access to knowledge. Our work focuses on the creation and monitoring of ethically and globally accessible and culturally acceptable KOS. The core issue of such information architecture is how to consider cultural diversity when designing KOS and access interfaces to knowledge. To provide an intercultural interface intended

for knowledge discovery in multilingual/multicultural contexts and to deliver full integration of KOS, we consider three types of activities (see Fig. 2), which form the iterative research-experimentation-evaluation cycle:

- Data collection and domain analysis (Phase 1);
- Method development (Phase 2);
- Experimentation and evaluation (Phase 3).

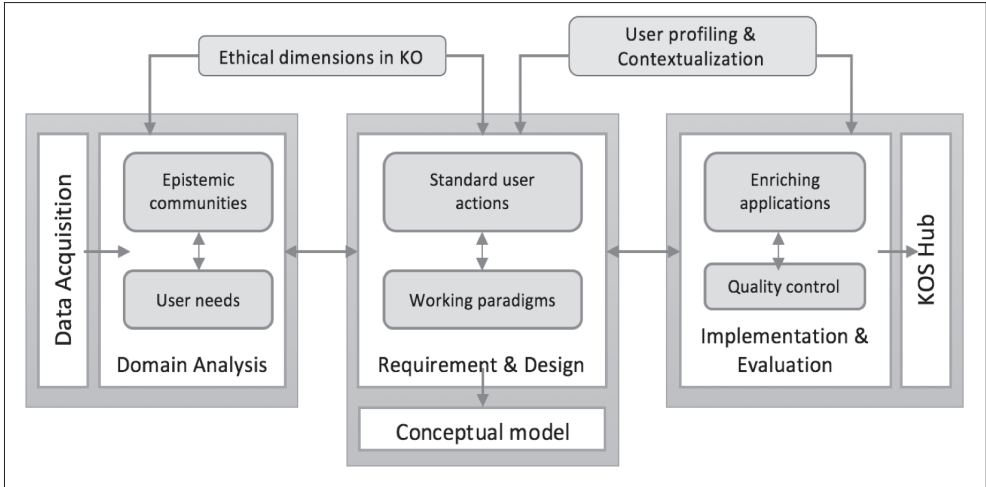


Fig. 2. Constitution of three principal phases

The project's output will be an intercultural interface which potential is to display not only equivalences with the pivot language but also with other communities/languages using the central structure/bone as a node (KOS hub). The main idea is to have concepts of more than two cultures on the screen to display (the switching language together with the local adaptations). This interface will have some common features with VIAF in the way that it is supposed to display all the cultures and languages. The difference is that we would like to have clear-cut displays of one culture which will connect to all the mappings standing behind the first circle. The focus is not to compare but to accommodate all the linguistic and cultural communities.

Regarding KOS functioning, there are alternative interfaces for novice and expert users based on HCI evaluation of user interface techniques in Phase 2. This feature allows expert users to issue the mappings between their language-cultures and the switching language. In this case, the end-user interface should include various functions related to data annotation, validation, classification, and so on. We would give novice users access to our system that already handles mappings via the web, and they would have the only display option. These suggested features in the web application (i.e., interface) should not be too complicated to develop once we decide the set of user profiles, based on the results and observations in Phase 1 (theoretical framework) and Phase 2 (methodology).

One major concern lies in the testing and the evaluation tasks in Phase 3, as the theory of knowledge organization operates with a number of assumptions about user needs and user behavior. For instance, classifications schemes – which have significant value in

a multilingual environment as they are language independent – are often criticized for their culturally biased and rigid structure. Faceted classifications, however, are considered more flexible and less rigid (Broughton 2006; Hudon & Mustafa El Hadi 2017). The variety of categories identified in various classification systems and indexing languages suggests that the faceted classification is just as much a useful analytical tool for category identification as a modeling tool for domain structuring and KOS construction. KOS construction based on facet analysis has been used in graphical user interfaces resulting in many application of networked knowledge organization systems (NKOS) in web information systems and services. Nonetheless, the application of the intercultural approach on facet analytical theory in a real-life scenario was not sufficiently tested. Few research studies have examined how knowledge organization can influence or alter the user behavior and culture in the digital environment. The above example of facet classifications confirms Hjørland's opinion that we do not know how many of the assumptions about knowledge classifications and their power in knowledge browsing in cross-collection, cross-language and cross-cultural would be true today if we give thought to the challenges caused by digital technologies "at both the practical and at the theoretical levels" (Hjørland, 2012, 299).

4.3. *Integration of multiple authorities*

The intercultural interface is designed in such a way that users from a given culture would adapt a universal language to their context and use it to interoperate with other cultures while taking advantage of a distributed network of adaptations. This section provides some examples of how the KOS hub integrates multiple controlled vocabularies. This central institution, which is in charge of the switching language, would manage all mappings and make them available to the different cultures or communities.

- (1) Exonym and endonym: many geographical places have different spellings and pronunciation (exonyms) in different languages due to historical reasons or a geographical feature that extends over more than one country. For its initial development, our demonstration uses English as the main language, and for each subject, the exonyms are included if they are available in local KOSs.
 - Brixen (Italian: Bressanone)
 - Lviv (German: Lemberg; Polish: Lwów)
 - Lille (Dutch: Rijsel; German: Ryssel)
 - Mosul (Arabic: الموصل / al-Mawsil; French: Mossoul; Kurdish (Kurmanji): Mûsil; Kurdish (Sorani): مووسڵ)
 - Wrocław (Czech: Vratislav; German: Breslau; Hungarian; Boroszló; Latin: Vratislavia)
 - English Channel [the] (Breton: Mor Breizh, "Sea of Brittany"; Cornish: Mor Bre-tannek, "British Sea"; French: Manche [la], "Sleeve [the]"; German: Ärmelkanal, "Sleeve Channel")

Another issue is that a geographical name may have almost the same pronunciation but slightly different writing (endonym) in two languages, sometimes due to transliteration, transcription, or the orthographies which do not match (Kerfoot & Närhi, 2006). Some examples are Sao Paulo (for São Paulo), Malaga (for Málaga) or Lubeck (for Lübeck). In all these cases mentioned above, we preserve the original graphic form with the same diacritics given by Wikidata and provide interlanguage links to the variations.

- (2) Cognate name: Many given names are derived from the Bible, names of early Christian saints, or varieties of ancient languages. Though they can be spelled different ways, all cognates of the same name have a common etymological origin. For each subject, we present its equivalents (cognates) in different languages or various linguistic areas:
- Peter (given name), in Peter the Great (French: Pierre Ier le Grand; Polish: Piotr I Wielki). Notes: Derived from Πέτρος (Petros) which means “stone” in Greek, the name Peter became popular, particularly in the community of Christians, due to the same name of a renown apostle. Other cognates of Peter include Petrus (Biblical Latin), Pere (Catalan), Pierre (French), Piotr (Polish), Pedro (Spanish; Portuguese), Petro (Ukrainian), or Phêrò (Vietnamese)
 - Catherine (given name) (German: Katharina; Polish: Katarzyna)
 - Louis (given name) (Dutch: Lodewijk; Italian: Luigi; German: Ludwig; Romanian: Ludovic; Portuguese: Luís).
- (3) Abortion: For a concept that copes with complicated realities, the subject portal provides other variants or matching concepts from other schemes to accommodate different social and cultural contexts. Even though the French word for the term is *avortement*, the French press seems to endorse medical terminology as it utilizes instead *IVG* (the short for *interruption volontaire de grossesse*). On the contrary, V.T.O.P. (voluntary termination of pregnancy) exists in English, but its use is less prevalent.
- (4) Euthanasia: Similar to the case of “abortion,” we present related terms (Death with Dignity) and closely matching concepts (Assisted-Dying; Physician-Assisted Death/Dying; Physician-Assisted Suicide) to the subject “euthanasia”. It should be noted that this term has a negative meaning in German-speaking countries because it associates with the Nazi eugenics policies, and the term *sterbehilfe* (assisted dying) is used instead.

These two examples mentioned above shed light on how a concise concept which contains the essence of complicated realities can be displayed in a subject portal together with its variations, related terms, exact matching or closely matching concepts from other schemes. Some attention is paid to use of multilingual authorities and multiple authority identifiers as a means of structuring information in the intercultural interface. A display that shows all “cultures” and links them in a single graph can be helpful to visualize and access to variations that might have been more established in other cultures. A possible solution is to navigate from various authority files such as VIAF, WorldCat, ISNI, SUDOC to an integrated record for each subject in the hub. This type of managing authority records based on linked authority identifiers is being utilized by large controlled vocabularies, such as those of Library of Congress, National Library of France, German National Library, and by library resource management systems like Ex Libris Alma.

5. Future works

Regardless of the type of architecture, the application should enable access to all mappings by navigating linked authority records, allowing the interface to display as many different “cultures” as desired. This application relies on the solution that endorses the equal

treatment among communities and cultures. On the one hand, it enables the creation of local classifications for different communities or cultures that would interconnect using one classification system as a switching language. On another hand, users from a given culture would adapt a universal language to their context and use it to interoperate with other cultures while taking advantage of a distributed network of adaptations. Each community would focus only on their own mapping, while the central institution in charge of the switching language would manage all mappings and make them available to the different communities. Local interfaces would have the potential to show not only an equivalence with the universal language but also with other communities' languages using the central institution as a node.

Discussions and research on terminology mappings and architectures are still going on in the knowledge organization field. We can cite, for example, the "noodle architecture" (Voß, 2016) that is supposedly more appropriate for the web. In this architecture, there would not be any central terminology, but all terminologies would be treated equally. It would be one of the alternative approaches to consider in a discussion on diversity and multiple cultures.

6. Conclusion

This paper attempts to provide elements to support the theoretical construction of ethically responsible KOS. It examines the practices and challenges of cultural interoperability and the place it occupies today in the information society marked by activities of intercultural exchange. It also illustrates a way to tackle the ethical factor of multilingualism, cultural hospitality, and the power to name by proposing an applicable intercultural interface. The goal of building and testing the conceptual model is to promote a semantic technology oriented and standards-based approach to managing controlled vocabularies and reuse of existing classification data to improve resource discovery in digital libraries which will help in achieving KOS sustainability. In this way, the ethical factor is integrated into the processes of development and revision of conceptual structures not only for information retrieval but also classification and indexing.

The purpose of the intercultural interface design is to address the problem of developing a mode of access and organization of knowledge which takes into consideration cultural diversity on a global scale. By far in its developing phase, the EKOS-Interface project is firstly a theoretical reflection that nourishes a proof-of-concept that is the culturally-inclusive and ethically-oriented KOS, which represents the primary deliverable. Through some demonstrations, the author tries to address global cultural biases by designing an inclusive KOS interface and acknowledging the importance of opening up the notion of cultural inclusiveness, i.e., focusing not only linguistic diversity (as a large part of the existing literature does), but also other social aspects, such as geography, religious affiliations, tradition, historical elements, ethnic, gender, which has been the primary object of research for the culture-oriented branch in KO. After all, one step towards achieving cultural interoperability is to promote processes, tools, and services that are not tied to any given dominant ideology, and which respect the varied forms of knowledge.

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Etycznie odpowiedzialne systemy organizacji wiedzy: w kierunku międzykulturowego interfejsu użytkownika

Abstrakt

Cel/Teza: W artykule omówiono wyzwania związane z wyznaczaniem teoretycznych założeń dla tworzenia systemu organizacji wiedzy (SOW), spełniającego postulaty międzykulturowości i odpowiedzialności etycznej.

Koncepcja/Metody badań: Najpierw poddano analizie problemy etyczne i społeczne związane z tworzeniem SOW. Następnie zilustrowano sposób rozwiązania problemu etycznego podejścia do projektowania SOW, proponując architekturę dla międzykulturowych interfejsów, która uwzględni szeroko rozumianą różnorodność kulturową w skali globalnej.

Wyniki i wnioski: Autor podkreśla znaczenie otwarcia pojęcia kulturowej inkluzywności i objęcia nim nie tylko kwestii różnorodności językowej, ale także innych aspektów kulturowych i społecznych, które mogą stanowić źródło rozwiązań godzących w poczucie równości i etniczności, takich jak zmiany geopolityczne, przynależności religijne, tradycja, elementy historyczne, etniczność. Takie podejście powinno uwzględniać interseksjonalność i kulturową interoperacyjność.

Oryginalność/Wartość poznawcza: Analizując lokalne uwarunkowania, autor oferuje wgląd w podstawowe podejścia uwzględniające różnorodność kulturową w projektowaniu SOW i interfejsów zapewniających dostęp do wiedzy.

Słowa kluczowe

Interoperacyjność kulturowa. Nakaz kulturowy. Nakaz etyczny. Organizacja wiedzy. System organizacji wiedzy.

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