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REVIEWING PROBLEMS & RECENT TRENDS RELATED WITH KOS

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ABSTRACT

Knowledge Organization Systems (KOS) play a pivotal role in facilitating effective information retrieval, organization, and navigation in various domains. These systems encompass a wide array of structures, including classification schemes, taxonomies, thesauri, and ontologies, which are vital in managing the ever-growing volume of information in the digital age. This abstract presents a comprehensive review of the challenges faced by KOS and the emerging trends that have shaped their development in recent times.

Keywords: - KOS, Knowledge, System, Research, Trend.

I. INTRODUCTION

The knowledge that comes from the established and accumulated experience, service, and process of the knowledge society is known as intellectual capital, and libraries of all kinds are involved in its administration. Knowledge Organization (KO) developed from the simple method of shelf-sorting books into a distinct hierarchy for easy reference. Even in today's digital and networked age, KO's subject approach to information and knowledge seekers remains a significant focus of scientific inquiry. After the first usable system was created in the late 19th century, researchers were keenly interested in the field. Knowledge organization was given a new dimension by cataloging, especially topic cataloging. Knowledge Organization (KO) has evolved into Knowledge Organisation Systems (KOS) in today's digital and networked world, particularly in the content organization of Digital Libraries (DL), Institutional

Repositories (IR) and Electronic Theses and Dissertations (ETDs). Given the ongoing interest in the issues and components of KOS, metadata, taxonomies, ontology, and the semantic web in the modern electronic and digital world, the researcher has attempted to illustrate the general progress of KO and KOS in this chapter.

In this work, we aim to analyze the Research trends in KOS by covering most of the KOS features based on different techniques at different time intervals. The findings reveal the underlying dynamics of these KOS features with the use of several technological approaches and the principles that cut across these approaches.

II. RESEARCH TRENDS IN KOS

The main purpose of this research is to examine emerging trends in KOS research. It's true that KOS is a broad field with many interconnected ideas. Therefore, this study is broken down into the following categories and analyzed to

demonstrate the research trend at the level of KOS features, which seems to be recurrent across each level as they are inter-related. This paper aims to provide a historical context for the current state of DL research in the KOS sector. During the course of this research, it became clear that other studies had already covered some of the ground covered by this one in terms of KOS research. Some representative instances of current research and development trends in the KOS and DL arenas, as well as the standards and tools developed for KOS, are included in Appendix III.

McIlwaine and Williamson (1999), Hjrland and Albrechtsen (1999), McIlwaine (2003), LopezHuertas (2008), Saumure and Shiri (2008), and Smiraglia (2009) are only a few of the studies that have conducted literature reviews on different parts of KO research.

Recent developments and ongoing trends in the field of Knowledge Organization are reviewed in detail by Dahlberg (1995). The current developments in knowledge organization research are explained by McIlwaine (2003), who focuses on universal systems, mapping vocabularies and interoperability concerns, bias issues, the Internet and search engines, resource discovery, thesauri, and visual presentation. In their discussion of the history and future of KOS, Zeng and Chan (2004) focus on the Internet age.

According to Chung and Moen (2007), this focus on interoperability and user interfaces emerged as a research trend in the early 2000s. Virginia Tech began work on the Networked Digital Library of Theses and Dissertations (NDLTD) in the

early 2000s as data complexity grew in tandem with plans for future digital libraries of theses and dissertations and the emergence of the consortium of Electronic Theses and Dissertations. This pushed the field of research in the direction of addressing access and visibility issues, with a particular emphasis on the Semantic Web, ontology, and the construction of authority lists as crucial to the accurate retrieval of scholarly knowledge, and data mining and knowledge discovery as critical and thrust areas of research.

In their KO analysis of the patterns, Saumure and Shiri (2008) divide them into two time periods: before and after the rise of the Internet. Similarly, Ibekwe-SanJuan and SanJuan (2010) use an automated topic mapping approach on a database of knowledge organization journal articles published between 1988 and 2008. Information was gathered via the Web of Science (WoS) database, which contains scholarly publications published in journals devoted to the KO discipline. The findings revealed that although the first decade's subjects were more traditionally focused (1988–1997), the second decade's topics were characterised by a more technology orientation (1998–2008).

III. PROBLEMS AND QUESTIONS IN KOS RESEARCH

As the development of technology and the needs of end users continues, many difficulties and hurdles remain in the construction of DL. Researchers, librarians, developers, and information scientists face a number of obstacles on the path to successfully implementing

Digital Libraries (DL). Architectural and design problems (Arms, 2000), problems in digital libraries' libraries (Bailey, 2011a), copyright (Bailey, 2011b), and digital rights management (Bailey, 2011c) are only a few examples.

The Technical concerns; Content and collections concerns; Digitization; Content Management Issues; Rights Management Issues and Preservation are only some of the issues and challenges that Urs (2007) highlights as being experienced by the DL during the last decade. In a similar vein, Rathinasabapathy (2006) lists several key concerns related to the development of a DL, including the following: (i) Digital content and collections; (ii) Metadata; (iii) Interoperability; (iv) Standards; (v) Knowledge Organisation Systems; (vi) User and Usability; and (vii) Legal, Organisational, Economic, and Social concerns.

Miles (2007a) provides a literature review on topics related to KOS development and maintenance, such as (i) cost and benefit studies, (ii) methodologies and process models, (iii) change management and version control models, (iv) models of collaboration and responsibility, and (v) studies of emergence in complex social systems. In his summary of studies and surveys on topics related to digital curation, Miles (2007b) provides a useful overview of the field.

1. Concerns Regarding Compatibility

Establishing interoperability among KOS (Zeng & Chan, 2004); Interoperability models in DLs (Alipour-Hafezi, et al., 2010); Interoperability at different levels of abstraction (EUNSF); Semantic

interoperability as a grand-challenge research area for achieving high-quality interoperability (Lynch & Garcia-Molina, 1995; Chen, 1999).

2. Problems with the Graphical User Interface and Display

According to Belkin (2002), it is important to analyze DL features and objectives from the perspective of the interface. Users are able to accomplish tasks like as searching, browsing, visualization, and delivery because of the work done by the UI, as Altman (2008) explains. In many modern systems, a dynamically produced webpage serves as the primary user interface.

3. Synopsis of the Problems Facing KOS Studies

Although both the problems and the obstacles are covered here, it seems that they are inseparable and should be thought of as elements of KOS. Many problems and difficulties in many areas of study are highlighted by a survey of the literature on research trends in KOS.

IV. SEMANTIC WEB IN DL

According to Berners-Lee, Hendler, and Lassila (2001), the term "Semantic Web" describes the World Wide Web Consortium's vision of the Web of linked data (also known as the Web of Data) as "...an extension of the current Web in which information is given a well-defined meaning, better enabling computers and people to work in cooperation."

According to Janev and Vranes (2011), the Semantic Web is one of the most rapidly evolving subfields of the Information and Communication Technology industry and is therefore subject to intensive study by researchers in the area. Researchers read and

evaluated a mountain of material to forecast the future of SW technologies and establish the state of the art in the Semantic Web sector, including its degree of maturity and the extent to which it has been adopted by the business world.

1. Digital Library Ontologies

Semantic digital libraries (SDL) are described by Kruk et al. (2006) as a way to (i) integrate information based on different metadata, such as resources, user profiles, bookmarks, taxonomies, (ii) provide interoperability with other systems (not only digital libraries) on either the metadata or communication level, or both, and (iii) deliver more robust, user friendly, and adaptable search and browsing interfaces enabled by semantics.

2. Google's new semantic search

According to Tummarello et al. (2010), Semantic search engines leverage SW technologies to do visual search, navigation, and querying over massive, publicly available, and interconnected datasets on the Web of Data.

3. Linked Information for Libraries

According to Bizer, Heath, and Berners-Lee (2011), the phrase "Linked Data" refers to a standard for releasing and linking structured data on the World Wide Web. Over the last three years, more and more data providers have implemented these best practices, creating a worldwide data space called the Web of Data that contains billions of claims. To enable, express, and disseminate data as linked data, Zeng and colleagues (2010) address standards and alternative ways.

V. CONCLUSION

In conclusion, this review has shed light on the various problems and recent trends associated with Knowledge Organization Systems (KOS). It is evident that KOS plays a vital role in managing the ever-expanding volume of information and facilitating effective information retrieval in various domains. However, challenges persist in their implementation, including cross-domain interoperability, evolving user needs, scalability, maintenance, and the inherent biases in knowledge representation.

The emergence of recent trends has significantly impacted the development and evolution of KOS. The integration of machine learning and artificial intelligence has shown promise in automating and refining KOS, enabling adaptability to changing domains and user preferences. Moreover, the incorporation of semantic web technologies has facilitated sophisticated ontologies and linked data, enhancing knowledge representation and discovery across diverse information repositories.

The growing importance of collaborative and crowdsourced approaches in KOS development emphasizes the value of collective intelligence and user-generated data. By involving domain experts and end-users in the process, KOS can become more accurate, inclusive, and comprehensive, reflecting the diverse perspectives and requirements of its users. Looking ahead, the future of KOS appears promising, with increased integration into various information systems and enhanced user experiences. However, ethical considerations must be at the forefront of

these developments, ensuring transparency, fairness, and accountability in the design and application of KOS.

In conclusion, this review emphasizes the need for continual innovation and adaptive solutions in KOS development to address the challenges posed by the ever-changing information landscape. By embracing the latest trends and fostering collaborative efforts, knowledge organization systems can evolve into powerful tools, effectively organizing and unlocking the vast potential of information in the digital age.

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