

Challenges and Opportunities for Knowledge Organization in the Digital Age

Proceedings of the
Fifteenth International ISKO Conference
9-11 July 2018
Porto, Portugal

Organized by
International Society for Knowledge Organization (ISKO),
ISKO Spain and Portugal Chapter
University of Porto – Faculty of Arts and Humanities
Research Centre in Communication, Information
and Digital Culture (CIC.digital) – Porto

Edited by
Fernanda Ribeiro
Maria Elisa Cerveira

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Fernanda Ribeiro
Maria Elisa Cerveira

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Table of Contents

Introduction

<i>Fernanda Ribeiro</i> -----	15
-------------------------------	----

Keynote Address

Supporting truth and promoting understanding: Knowledge Organization and the curation of the infosphere <i>David Bawden</i> -----	17
--	----

Foundations and Methods for Knowledge Organization

Among dictionaries, reference works and concept systems: can the terminology in International Standard ISO 5127:2017 contribute to Knowledge Organization? <i>Axel Ermert</i> -----	29
--	----

An Analysis of the theoretical and practical application of Diplomatics to archival description in Knowledge Organization <i>Natalia Bolfarini Tognoli, Ana Célia Rodrigues</i> -----	43
--	----

Applied Knowledge Organization and the history of the world <i>Rick Szostak</i> -----	52
--	----

Approaches to the concepts of exhaustivity and specificity in ISKO International meeting proceedings: 2000-2017 <i>Maria da Graça Simões, Daniel Martínez-Ávila, Blanca Rodríguez-Bravo, Patricia de Almeida, Isadora Victorino Evangelista</i> -----	58
--	----

Articulating a cultural research program for Knowledge Organization Systems <i>Gregory H. Leazer, Robert Montoya, Jonathan Furner</i> -----	66
--	----

Aspects regarding the notion of subject in the context of different theoretical trends: teaching approaches in Brazil <i>Brisa Pozzi de Sousa, Cristina Dotta Ortega</i> -----	74
---	----

Automatic indexing and ontologies: the consistency of research chronology and authoring in the context of Information Science <i>Maria da Graça Simões, Luís Miguel Machado, Renato Rocha Souza, Maurício Barcellos Almeida, António Tavares Lopes</i> -----	86
---	----

Big data, Knowledge Organization and decision making: opportunities and limits <i>Amos David, Nadine Ndjock</i> -----	95
Classification and Knowledge Organization Systems: ontologies and archival classification <i>Thiago Henrique Bragato Barros, Daniel Libonati Gomes</i> -----	103
Classification of photographs: methodological concepts in Archival Science, Library Science and Museum Science <i>Ana Cristina de Albuquerque, Luciane de Fátima Beckman Cavalcante</i> -----	112
Comparing the use of full text search between a conventional IR System and a DBMS <i>Edson Marchetti da Silva</i> -----	120
Computer-assisted checking of conceptual relationships in a large thesaurus <i>Decio Wey Berti, Jr., Gercina Lima, Benildes Maculan, Dagobert Soergel</i> -----	128
The Contribution of Semiotics to Knowledge Organization for music information <i>Camila Monteiro de Barros, Lígia Maria Arruda Café, Audrey Laplante</i> -----	137
Critical questions for big data approach in knowledge representation and organization <i>Lala Hajibayova, Athena Salaba</i> -----	144
Developing a field of knowledge through bibliography: art history in the 16 th century <i>Giulia Crippa</i> -----	152
Different parameters for Knowledge Organization in archives <i>Sonia Troitiño</i> -----	160
Document representation with images: an experimental milestone <i>Marcilio de Brito, Widad Mustafa El Hadi, Maja Žumer, Simone Bastos Vieira, Marcos de Brito</i> -----	167
Domain analysis of scientific production in Information and Communication Technology in the context of small farmers <i>Fábio Mosso Moreira, Ely Francina Tannuri de Oliveira, Ricardo César Gonçalves Sant’Ana</i> -----	176
Epistemic communities, domain analysis, and Kuhn: dialogs and intersections in Knowledge Organization <i>Daniel Martínez-Ávila, Isadora Victorino Evangelista, Maria da Graça Simões, José Augusto Chaves Guimarães</i> -----	184
Epistemic <i>LOCI</i> : linguistic and critical meta-methodology in Knowledge Organization <i>Tatiana de Almeida, Gustavo Silva Saldanha</i> -----	191
Epistemological challenges in Knowledge Organization in the digital age <i>Rosa San Segundo, Maria Adelina Codina-Canet</i> -----	198

Facet: itself a multifaceted concept <i>Michèle Hudon, Alexandre Fortier</i> -----	204
Feasibility of implementing PRESSoo model in organizing Persian serials <i>Negin Shokrzadeh Hashtroudi, Mohsen Haji Zeinolabedini</i> -----	212
Foundations and methods for Knowledge Organization in European iSchools courses <i>Olívia Pestana</i> -----	224
A Framework to represent variables and values in Social Science research data sets to support data curation and reuse <i>Guangyuan Sun, Christopher S. G. Khoo</i> -----	231
The Genesis of Documentation in Brazil: Manoel Cícero Peregrino da Silva and Paul Otlet (1900-1924) <i>Carlos Henrique Juvêncio, Georgete Medleg Rodrigues</i> -----	240
Global Knowledge Organization, “super-facets” and music: universal music classification in the digital age <i>Deborah Lee, Lyn Robinson, David Bawden</i> -----	248
Historical ambiguity: a lens for approaching outdated terms <i>Lilium Rajan</i> -----	256
How Knowledge Organization helped to shape the emerging field of Terminology in Canada <i>Lynne Bowker</i> -----	265
Influence of metatheoretical research in Knowledge Organization <i>Paula Carina de Araújo, Joseph T. Tennis</i> -----	273
Information and argument structures in Sociology research abstracts <i>Wei-Ning Cheng, Christopher S. G. Khoo</i> -----	282
Information and knowledge ecology: a field for research in Knowledge Organization <i>Wieslaw Babik</i> -----	290
Information from jussive processes <i>Elliott Hauser</i> -----	300
Intellectual history, history of ideas, and subject ontogeny <i>Joseph T. Tennis</i> -----	308
Is the massive incorporation of e-books into university libraries devaluing the technical processes related to the assigning of subject headings and classification codes? <i>Isidoro Gil-Leiva, Mariângela Spotti Lopes Fujita, Pedro Manuel Díaz Ortuño, Daniela Majorie dos Reis</i> -----	314

Knowledge Organization in editorial policies for titles, abstracts and keywords in JCR-indexed journals: an exploratory study in the areas of Information and Communication Sciences <i>Mariângela Spotti Lopes Fujita, María-del-Carmen Agustín-Lacruz, Ana Lúcia Terra</i> -----	321
Knowledge Organization in the health field: an ontology project to improve the information retrieval process <i>Claudio Jose Silva Ribeiro, Diones Ramos da Silva</i> -----	330
Literary warrant-based approach to organize KO terminology: criteria and method <i>Mario Barité, Mirtha Rauch, Ana Inés Brozia, Micaela Morales</i> -----	339
Medical ontology: Siddha System of Medicine <i>Hemalata Iyer, K.S. Raghavan</i> -----	347
The Modern and its impact on models of information organization in Brazil: the decline of the National Library and the rise of the National Book Institute (1930-1954) <i>Carlos Henrique Juvêncio, Georgete Medleg Rodrigues</i> -----	356
The Onomasiological approach and the function of definitions in the elaboration of domain models in ontologies <i>Maria Luíza de Almeida Campos, Hagar Espanha Gomes</i> -----	363
OntoM4IS: ontology reuse method for Information Science <i>Helder Noel Monteiro Firmino, Gercina Ângela de Lima</i> -----	371
Parsimony in Biological and Colon Classifications <i>Robert D. Montoya</i> -----	377
The Penumbra-line: Ranganathan's journeys and the genesis of the APUPA pattern <i>Luca Giusti</i> -----	380
Photography as a legitimate technique for domain analysis in Knowledge Organization <i>Eva Hourihan Jansen</i> -----	392
Reconstructionism: a comparative method for viewpoint analysis and indexing using the example of Kohlberg's moral stages <i>Michael Kleineberg</i> -----	400
A Relation typology in Knowledge Organization Systems: case studies in the research data management domain <i>Jian Qin</i> -----	409
Reorganization of knowledge in technical documents for the information system: the extraction of logico-cognitive information from heterogeneous administrative data <i>Omar Larouk, Mabrouka El Hachani</i> -----	416
The Retrieval power added by subject indexing to bibliographic databases <i>Philip Hider</i> -----	426

Risks and requirements of an applied Information Science research framework in healthcare <i>Fernanda Gonçalves, Gabriel David</i> -----	432
Semantic warrant, cultural hospitality and knowledge representation in multicultural contexts: experiments with the use of the EuroVoc and UNBIS thesauri <i>Roger de Miranda Guedes, Maria Aparecida Moura</i> -----	442
Solid Foundations and some secondary assumptions in the design of bibliographic metadata: toward a typology of complementary uses of metadata <i>Athena Salaba, Joseph T. Tennis</i> -----	450
The Spirit of inquiry's power to influence in 21st-century KO research: Jesse Shera and Margaret Egan <i>José Augusto Chaves Guimarães, Maria Claudia Cabrini Gracio, Daniel Martínez-Ávila, Rodrigo de Sales</i> -----	460
Truth, relevance, and justice: towards a veritistic turn for KO <i>Jonathan Furner</i> -----	468
Verbal protocols in Brazilian Information Science: a perspective from indexing studies <i>Paula Regina Dal' Evedove, Roberta Cristina Dal' Evedove Tartarotti, Mariângela Spotti Lopes Fujita</i> -----	475
Who is Tesauro? The man, words and things <i>Gustavo Silva Saldanha, Naira Christofoletti Silveira, Giulia Crippa and Tatiana de Almeida</i> -----	483
Wikipedia categories in research: towards a qualitative review of uses and applications <i>Jesús Tramullas, Ana I. Sánchez-Casabón, Piedad Garrido-Picazo</i> -----	490

Interoperability towards Information Access

A Comparative analysis and evaluation of bibliographic ontologies <i>Maria Teresa Biagetti</i> -----	501
A Conceptual model for an OWL ontology to represent the knowledge of transmedia storytelling <i>Juan Antonio Pastor Sánchez, Tomás Saorín Pérez</i> -----	511
Connecting KOSs and the LOD Cloud <i>Rick Szostak, Andrea Scharnhorst, Wouter Beek, Richard P. Smiraglia</i> -----	521
Converting UDC to BCC: comparative approaches to interdisciplinarity <i>Richard P. Smiraglia, Rick Szostak</i> -----	530

Culturally relevant relationships: publishing and connecting digital objects in collections of archives, libraries, and museums over the Web <i>Carlos H. Marcondes</i> -----	539
Derivative interpretation of biographical sketches (bios) supporting innovative information <i>Marcia Lei Zeng, Sophy Shu-Jiun Chen</i> -----	549
Extending the scope of library discovery systems via hashtags <i>Louise F. Spiteri</i> -----	557
An FRBR-based approach for transforming MARC records into linked data <i>Ya-Ning Chen</i> -----	565
From uniform identifiers to graphs, from individuals to communities: what we talk about when we talk about linked person data <i>M. Cristina Pattuelli</i> -----	571
Identifying semantic characteristics of user interaction datasets through application of a data analysis <i>Fernando de Assis Rodrigues, Pedro Henrique Santos Bisi, Ricardo César Gonçalves Sant'Ana</i> -----	581
Image organization on the Web: an analysis from the perspective of cultural heritage of rural farms in Brazil <i>Luciana de Souza Gracioso, Leticia Reis da Silveira, Maria da Graça Simões, Luzia Sigoli Fernandes Costa</i> -----	588
Information access in the digital era: document visualization strategy <i>Francisco Carlos Paletta, Armando Malheiro da Silva</i> -----	597
Integrating libraries, archives, museums and art galleries with Linked Data: initiatives study <i>Ana Carolina Simionato, Felipe Augusto Arakaki, Plácida Leopoldina Ventura Amorim da Costa Santos</i> -----	606
Knowledge Organization in a Web collaborative environment <i>Vânia Mara Alves Lima, Cibele de Araújo Camargo Marques dos Santos</i> -----	613
Knowledge Organization Systems and cultural interoperability in open humanitarian settings <i>Quoc-Tan Tran</i> -----	624
Knowledge Organization systems used in European national libraries towards interoperability of the semantic Web <i>Dorota Siwecka</i> -----	633
The Need to interoperate: structural comparison of and methodological guidance on mapping discipline-specific subject authority data to wikidata <i>Andreas Oskar Kempf</i> -----	644

Phenomenon-based vs. disciplinary classification: possibilities for evaluating and for mapping <i>Claudio Gnoli, Andreas Ledl, Ziyong Park, Marcin Trzmielewski</i> -----	653
Relationship status: libraries and linked data in Europe <i>Diane Rasmussen Pennington, Laura Cagnazzo</i> -----	662
The Role of Knowledge Organization tools in open innovation platforms <i>Ricardo Eito-Brun</i> -----	666
Subject access of Mexican television news broadcasts on the Web <i>Silvano Soto-Hernández, Catalina Naumis-Peña</i> -----	674
Tags on healthcare information websites <i>Marit Kristine Ådland, Marianne Lykke</i> -----	684
Towards integrated systems for KOS management, mapping, and access: Coli-conc and its collaborative computer-assisted KOS mapping tool Cocoda <i>Uma Balakrishnan, Jakob Voß, Dagobert Soergel</i> -----	693
Towards the semantic annotation and the prevention of the loss of information of second opinion requests from rural Brazilian primary healthcare providers: the Q-codes use case – a work in progress <i>Melissa P. Resnick, Elena Cardillo, Marc Jamouille, Magdala de Araujo Novaes, Frank S. Shamenek</i> -----	702
Use of conceptual relations for semantic integration of scientific publications and research data <i>Luana Farias Sales, Luís Fernando Sayão</i> -----	711
A Value-based approach to modelling interoperability in Knowledge Organization Systems <i>John Adetunji Adebisi, Babajide Samuel Afolabi, Bernard Ijesunor Akhigbe</i> -----	720
VIAF and OpenCitations: cooperative work as a strategy for information organization in the linked data era <i>Erika Alves dos Santos, Marcos Luiz Mucheroni</i> -----	729
 Societal Challenges in Knowledge Organization	
Author information for Knowledge Organization in the digital age <i>Wan-Chen Lee</i> -----	739
Challenges of organization and retrieval of photographs on social networks on the Internet <i>Anna Carla Almeida Mariz, Raquel Oliveira Melo, Thales Almeida Mariz</i> -----	746
Challenges to Knowledge Organization in the era of social media: the case of social controversies <i>Nathanaëla Andrianasolo, Adrian-Gabriel Chifu, Sébastien Fournier, Fidelia Ibekwe-SanJuan</i> -----	754

Copyright infringement: between ethical use and legal use of information <i>Arthur Coelho Bezerra, Tatiana Sanches</i> -----	762
Dealing with the paradoxes of customer opinion for effective decision support in churn management <i>Ayodeji O.J Ibitoye, Olufade F.W Onifade, Chika O Yinka-Banjo</i> -----	770
Design Science as a methodology for the development of Knowledge Organization Systems in museological entities <i>Mariana Cantisani Padua, Maria José Vicentini Jorente, Natalia Nakano</i> -----	786
Digital heritage: challenges and opportunities in the access and organisation of digital knowledge in contemporary societies <i>Tiago Trindade Cruz</i> -----	795
Enhancement of digital heritage through digital social networks <i>Camille Rondot, Emmanuelle Chevry-Pébayle</i> -----	804
Epistemology and Ethics of big data <i>Moisés Rockembach, Armando Malheiro da Silva</i> -----	812
Information Design as knowledge technology in the organization of digital information environments on the Zika Virus and its effects <i>Maria José Vicentini Jorente</i> -----	820
Intersectionality and the social construction of Knowledge Organization <i>Maria Aparecida Moura</i> -----	830
Knowledge Organization in the digital age: the complexity of the global labor market <i>Francisco Carlos Paletta, Armando Malheiro da Silva</i> -----	839
Memories in dispute, and reconfigurations of cultural heritage: for an Ethnography of museums <i>Samuel Ayobami Akinruli, Luana Carla Martins Campos Akinruli</i> -----	848
The Mobile phone between challenge and expectations: a potential for information sharing between Algerian breeders and veterinarians <i>Radia Bernaoui, H. Peter Ohly, Kebbab Salim, Mohamed Hassoun</i> -----	856
Negotiating participatory KO in crowdsourcing infrastructures <i>Ina-Maria Jansson</i> -----	863
New ways to produce shared knowledge to improve cooperation in overcoming societal challenges in healthcare: the lever of innovative interface organizations in France <i>Christian Bourret</i> -----	871

The Role of Neuroscience in information and knowledge appropriation <i>António José de Bastos Leite, Francisco Carlos Paletta, Maria Fernanda da Silva Martins, Teresa Silveira</i> -----	880
Testing library catalog analysis as a bibliometric indicator for research evaluation in Social Sciences and Humanities <i>Maria Teresa Biagetti, Antonella Iacono, Antonella Trombone</i> -----	892
What do museum website users expect from linked open data? <i>Alexandre Fortier, Elaine Ménard</i> -----	900
What is happening about KOS in Spain: scientific production analysis, 2000-2017 <i>José A. Moreiro-González, Virginia Ortiz-Repiso</i> -----	908

Posters

Challenges in management and Knowledge Organization of documental heritage: key factors in the methodology of diligent search for orphan works <i>Rosario Arquero-Avilés, Brenda Siso-Calvo, Gonzalo Marco-Cuenca, Silvia Cobo-Serrano</i> -----	921
A Connotative trust-based paradigm to minify societal challenge(s) in Knowledge Organization Systems <i>Ojo Stephen Aderibigbe, Bernard Ijesunor Akhigbe, Babajide Samuel Afolabi, Emmanuel Rotimi Adagunodo</i> -----	924
The Contribution of research on information quality to Knowledge Organizatio <i>Priscila Basto Fagundes, Douglas Dyllon Jeronimo de Macedo, Enrique Muriel Torrado, Adilson Luiz Pinto</i> -----	927
Creation of a domain ontology in CIDOC CRM OWL format using heterogeneous textual data related to industrial heritage <i>Eric Kergosien, Kaouther Ben Smida, Rémi Cardon, Natalia Grabar, Mathilde Wybo</i> -----	931
Diplomatic forensics: a necessary historical review for the analysis of the born-digital record <i>Juan Bernardo Montoya-Mogollón, Sonia Maria Troitiño</i> -----	937
The French military documentary system to anticipate health risk: content and information classification <i>M.Tanti</i> -----	940
Gamification as a system for developing knowledge in the classroom: a proposal based on an educational innovation project <i>Rosario Arquero-Avilés, Gonzalo Marco-Cuenca, Alicia Arias-Coello, Brenda Siso-Calvo, Silvia Cobo-Serrano, Carmen Soler-Vaquero</i> -----	945

Interdisciplinary research organization: superimposing linked library data, linked research information and research data with interdisciplinary Knowledge Organization <i>Ingo Frank</i> -----	948
Knowledge Organization and information retrieval in institutional repositories <i>Agnes Hajdu Barat</i> -----	951
Knowledge Organization System interoperability: the cogitation of user interfaces for better interactivity <i>Nkechinyere Joy Olawuyi, Bernard Ijesunor Akhigbe, Babajide Samuel Afolabi</i> -----	955
Mapping perspectival ambiguity in Bioethics: revisiting the viewpoint warrant <i>Denis Kos, Sonja Špiranec, Ante Čović</i> -----	959
A Model for decision making (DM) in territory management: social implications <i>María J. López-Huertas, Diego Martín Oliva</i> -----	962
State of the art of organization and administration of libraries in Brazil: preliminary results <i>Jaqueline Santos Barradas, Eliane Cristina Maceió Ferreira</i> -----	966
Web archiving of elections and Brazilian possibilities <i>Moisés Rockembach, Lisiane Braga Ferreira</i> -----	969
 Workshops	
The Politics of classification <i>Robert D. Montoya, Melanie Feinberg, Jonathan Furner, Gregory H. Leazer, Joseph T. Tenni</i> -----	975
Thematic representation and metadata of photographic documents <i>Ana Cristina de Albuquerque, Ana Carolina Simionato</i> -----	979
 List of Contributors and Authors' Index -----	 983

Challenges and opportunities for Knowledge Organization in the digital age

Proceedings of the 15th International Conference International Society for Knowledge Organization

Introduction

The digital and networked society in which we live is shaped by two paradigms that, since the middle of the last century, have been structurally changing our lives: the technological paradigm (Manuel Castells) and the paradigm of complexity (Edgar Morin). On the one hand, we are witnessing an increasingly accelerated evolution of technologies and communication networks, which means rapid change and constant dynamism; on the other hand, we live within a framework of complexity, challenges, new ideas and new forms of relationships and attitudes, which we cannot completely dominate given the fact that we are actors in the process and do not have enough critical distance to reflect on it. The information phenomenon has a central position in this context, since in symbiosis with technology it is the engine of change and innovation in which we are daily involved. In academia and in business, as well as in the professional and leisure activities that we pursue, we perceive that the world is changing in an accelerated way and that the processing, organization, dissemination and management of information in general requires study, research and development of theoretical and applied models that respond to the needs of society.

It is in this context that the 15th International ISKO Conference is held in Porto (Portugal) under the topic *Challenges and opportunities for KO in the digital age*. ISKO has been organizing biennial international conferences since 1990, in order to promote a space for debate among Knowledge Organization (KO) scholars and practitioners all over the world. The fourteen conferences already organized have focused on a wide variety of topics related to KO and its fundamental role in social, economic and cultural scenarios: tools for KO (Darmstadt, Germany, 1990), Cognitive paradigms in KO (Madras, India, 1992), KO and quality management (Copenhagen, Denmark, 1994), KO and change (Washington, USA, 1996), Structures and relations in KO (Lille, France, 1998), Dynamism and stability in KO (Toronto, Canada, 2000), Challenges in knowledge representation and organization for the 21st century (Granada, Spain, 2002), KO and the global information society (London, UK, 2004), KO for a global learning society (Vienna, Austria, 2006), Culture and identity in KO (Montréal, Canada, 2008), Paradigms and conceptual systems in KO (Rome, Italy, 2010), Categories, contexts and relations in KO (Mysore, India, 2012), KO in the 21st century - between historical patterns and future prospects (Krakow, Poland, 2014), KO

for a sustainable world (Rio de Janeiro, Brazil, 2014).

This time, organization of the International ISKO Conference is the responsibility of the ISKO Iberian Chapter, in association with the Faculty of Arts of the University of Porto, through CIC.digital - Center for Research in Communication, Information and Digital Culture - Porto.

The ISKO Iberian Chapter was founded more than two decades ago and, from 1993 to 2017, it has organized thirteen biennial conferences besides publishing the respective proceedings, which can be consulted from its website (<http://www.iskoiberico.org/congresos/>).

The topics under discussion in the 15th International ISKO Conference are intended to cover a wide range of issues that, in a very incisive way, constitute challenges, obstacles and questions in the field of KO, but also highlight ways and open innovative perspectives for this area in a world undergoing constant change, due to the digital revolution that unavoidably moulds our society. Accordingly, the three aggregating themes, chosen to fit the proposals for papers and posters to be submitted, are as follows: 1 – *Foundations and methods for KO*; 2 – *Interoperability towards information access*; 3 – *Societal challenges in KO*. In addition to these themes, the inaugural session includes a keynote speech by Prof. David Bawden of City University London, entitled *Supporting truth and promoting understanding: knowledge organization and the curation of the infosphere*.

In response to the call for papers, 162 proposals were submitted, including papers, posters and workshops, from which 110 papers and 24 posters were selected by the Programme Committee for oral presentation at the Conference as well as two workshops, the latter taking place after the conference, on 12th July. Although not all of the papers are included in the proceedings, the wide-ranging volume now published contains about 88% of the texts approved and it should be noted that some of these papers were also submitted to the *Best Doctoral Student Paper Award* established in recognition of PhD students' work.

The Conference was supported by the University of Porto, the Foundation for Science and Technology - FCT, Banco Santander, and the company Recondicionados.pt, which sponsored the Best Doctoral Student Paper Award. We gratefully acknowledge all of them and express publicly our thanks.

At a time when we are constantly facing challenges and opportunities, we hope that the texts now published will be a useful tool for reflection and work, and constitute a further step forward in the field of KO.

*Fernanda Ribeiro
Porto, May 2018*

Keynote

David Bawden

Supporting truth and promoting understanding: Knowledge Organization and the curation of the infosphere

Abstract

This paper considers the response of knowledge organisation (KO) to a variety of problems and pathologies associated with the post-factual, or post-truth, society. It argues that there are no quick fixes, but that KO has several roles to play in mitigating these problems, particularly in the promotion of understanding, as well as the communication of information and the sharing of knowledge. Borrowing from Floridi's Philosophy of Information, it argues that KO, and more broadly library and information science (LIS), should address these problems as part of our role as 'curators of the infosphere'.

Introduction

This paper addresses two of the main themes of this conference, by considering a new foundational direction and purpose for knowledge organisation, as a response to certain societal challenges to the effective communication of information and knowledge. The new direction involves a realignment of purpose; from knowledge organisation being applied in the cause of the effective provision of information and documents to its application for the explicit purpose of promoting understanding. The societal challenges which this may address the the much-discussed problems of the post-factual or post-truth society, with its accompanying phenomena of fake news, the death of expertise, and the rest. This paper builds on a session at the ISKO UK 2017 annual meeting, devoted to these issues, and goes beyond it to consider how the promotion of understanding may in itself contribute to a solution. It uses Luciano Floridi's Philosophy of Information as a theoretical back-drop throughout.

Societal problems

The linked collection of social problems which have been described by such terms as 'fake news', 'alternate facts', 'post-truth society', 'post-factual society', 'death of expertise', 'filter bubbles', and 'social media echo chambers' are well known. Indeed, 'post-truth' was Oxford Dictionaries' Word of the Year for 2016, and 'fake news' was Collins Dictionaries equivalent for 2017, with 'echo-chamber' on its shortlist. Together, they describe a situation where objective factual truth is denied, expert informed, opinion is derided, and exposure to novel and challenging ideas is actively avoided. This situation, which is in many respects the antithesis of what library and information science (LIS) has sought to promote, and causes soul-searching within the theory and

practice of LIS (see, for example, Bawden 2017 and Cooke 2017). It has not arisen *de novo*: fake news has a long history (Cooper 2017), while the philosopher Bertrand Russell observed more than seventy years ago that "... most people go through life with a whole world of beliefs that have no sort of rational justification... People's opinions are mainly designed to make them feel comfortable: truth, for most people is a secondary consideration." (Russell 1942). Our present concerns are the culmination of a series of changes in the social and informational environment, brought into stark relief by political issues in Europe and North America from 2016, accompanied, and to an extent brought about, by a torrent of misinformation and disinformation (Clark 2017, Corner 2017, Wardle and Derakhshan 2017). A Pew Internet study carried out in early 2017 found a panel of experts almost evenly divided as to whether the problems could be ameliorated or would become worse over the next decade (Anderson 2017).

Naturally, many well-intentioned proposals have been advanced to remedy the situation. Some have addressed deep seated issues, in educational systems, in economic and social policy, in regulation of the media (including social media), and in political structures. Others, including several advanced from within the LIS community, have recommended more immediate and specific remedies; see Clark (2017) for an overview. Some have focused on the development of IT solutions, particularly with the algorithms used to filter news in social media and with automated fact checking and comparison (see, for example, Cooper 2017, Madrigal 2017 and Tomchak 2017). Others have advocated the enhancement of information and digital literacies (see, for example, Cooke 2017, Polizzi 2017 and Poole 2017), and of restoring the importance of expert objective fact checking and 'kite marks' (see, for example, Cooper 2017, Jirotko and Webb 2017 and O'Leary 2017).

My view is that, although these sort of initiatives may well have value, taken alone they will have relatively little impact. The problems and issues are deep-rooted, 'systemic' as Beckett (2017) puts it, and are not amenable to any 'quick fix'. As the philosopher of information Luciano Floridi emphasises, the more important the problem, the more it needs a long period of reflection to find the best solution. And as my colleague Lyn Robinson and I have suggested more specifically, LIS has no quick fix for these issues, and we should not pretend that we have; Beckett (2017) suggests the same for journalism in respect of fake news. We believe that LIS has a very considerable contribution to make, but it must be a deeper level than a tweak to an algorithm, a guide to information evaluation, or a reliance on the manipulation of big data (Robinson 2016, Bawden 2017, Poole 2017); as Floridi (2016) puts it, solving the problems of fake news and the rest requires a reshaping of the infosphere, our whole information environment and our interactions within it.

It seems to me that part of LIS's contribution to a longer-term approach to these issues will certainly lie in knowledge organisation. This has already been noted by

others. ISKO UK devoted a session at their 2017 annual conference to 'False narratives: developing a KO community response to post-truth issues' (ISKO 2017), and a plenary discussion of the Dublin Core Metadata Initiative in October 2017 debated 'A metadata community response to the post truth information age' (DCMI 2017). We will include points made at these sessions, and consider some other possibilities, later. First, we will make a slight detour, and think about the nature of understanding.

Promoting understanding

One way of expressing the problems of post-factual, expertise-less society is to say that it lacks a full and clear understanding of the issues facing it (Robinson 2016, Bawden 2017). Lyn Robinson and I have argued that LIS should take a new stance of focusing on the promotion of understanding as much as on the provision of information and the sharing of knowledge in an era when, for most people for the most part, information is provided through search engines, particularly Google, through a few encyclopedic websites, particularly Wikipedia, and through social media (Bawden and Robinson 2016A, 2016B). In this environment, we contend, the promotion of understanding falls, arguably uniquely, within the remit of LIS; this seems to be a novel suggestion, although it has been supported by Gorichanaz (2016, 2017), and fits within the Floridi-derived idea of LIS professions as 'curators of the infosphere' (Bawden and Robinson 2018).

There is, we may say, little understanding of understanding, in as much as it is defined very differently by various authors. We may note that Ackoff (1989) in his original formulation of the well-known data-information-knowledge-wisdom model, included understanding, which he characterised as 'an appreciation of why' as a high-level concept, between knowledge and wisdom. In the widely-used educational taxonomy due to Bloom, on the other hand, it comes as a rather low-level concept, above remembering, but below applying, analysing, etc. (Anderson, Krathwohl and Bloom 2001).

On the basis of an analysis of various conceptions of understanding (for details of which, see Bawden and Robinson 2016A, 2016B), we propose a definition of understanding, relevant to the purposes of LIS, following Ackoff, and situated within Floridi's Philosophy of Information:

Information is taken to be well-formed, meaningful, truthful data. Knowledge is taken to be information organised in a network of account-giving inter-relations. Understanding occurs when a conscious entity, supported as necessary by information systems, appreciates the totality of a body of knowledge, including its interconnections. The extent to which the knowledge is incomplete, contradictory or false determines the degree to which understanding is less than complete.

Developing understanding in this sense would seem to be a worthy aim for LIS, and on which may go some way towards helping mitigate the societal problems noted above. However, we need to note that people may have an understanding of a topic, in

this sense, based on misinformation or disinformation, and may be impervious to contradictory information (see, for example, Requarth 2017), and this may be reinforced by emotional attachments to certain viewpoints (Beckett 2017, Poole 2017). We should therefore add a rider, to the effect that the extent to which someone is open to changing their views on the basis of new information, in effect to the extent of their curiosity, is also a measure of the completeness of their understanding. This could amount to a commitment (individual or societal), to accepting, indeed actively seeking, new knowledge even if it be potentially disruptive of current understanding (Bawden and Robinson 2016B). For LIS, this fits in well with the suggestions of Beckett (2017) that news media should provide content that is stimulating and challenging as well as relevant, and of Finch (2017) that libraries should be as much a safe place to indulge curiosity, rather than a trusted dispense of facts and information, or a repository of the truth.

Expressed in this way, we can see that the development of understanding may in itself be a powerful force for counteracting the problems discussed above; Bradley (2017) explicitly notes that helping people to understand and use items in their information environment is a role for libraries in countering the fake. It is important to note that developing understanding, in the sense meant here, is a broad and general approach, rather than a specific tool or technique, and goes far beyond didactic approaches to evaluation of information. Information systems are beginning to be developed to support understanding, from the relative conceptual simplicity of Google's Knowledge Graph, which integrates information from a variety of sources with the aim of giving a quick overview, to systems explicitly aiming at developing understanding from a *corpus* of sources. As an early example of the latter, see Donne *et al.* (2012).

We now turn to consider the ways in which knowledge organisation may contribute to these linked aims: the promotion of understanding, and the mitigation of the problems of the post-factual society.

KO's contribution

As suggested above, a variety of contributions to the amelioration of these problems have been suggested. At the risk of over-simplification, we can consider them under five headings.

First, we might notice the suggestion that an ontology, taxonomy, terminology, or glossary of the post-truth society, its pathologies, and potential solutions, may be of value in itself, as a way of clarifying the concepts and their inter-relations, and as a guide to action (Bradley 2017, Clark 2017, Poole 2017, Wardle and Derakhshan 2017). For the most detailed example yet extant, see Synaptica's *Post-Trith Forum Knowledge Base* at <https://www.posttruthforum.org>.

Second, there is what we might think of the classic, if limited, response of KO:

adaptation of methods of resource description, and revision of existing descriptions. One popular example of the former is the idea of 'credibility metadata', the addition of terms aimed at reducing misinformation and disinformation by establishing veracity of resources (Wardle and Derakhshan 2017). This may involve markers of location, time, etc. on items, or metadata to note 'quality factors', such as that a source has a corrections policy, or that the author of an item has written on the topic before (Cuellar 2017). Conversely, indexing may directly address the 'fake' nature of an item, as in the idea of adding a term for 'satirical article' (Quinn 2016, Cuellar 2017). The latter, by which discredited materials may be identified as such, is well exemplified by the controversy over the reclassification of Holocaust denial literature as 'historiography' rather than 'history' (Simon XIX 2017).

These responses are generally implemented by traditional intellectual metadata construction. The third category is the use of automated classification and indexing to attempt to identify and categorise fake news and other pathologies of the post-factual society; of the many developments of this kind, a good, albeit simple, example of a classifier to distinguish genuine news items from fake is given by McIntire (2017). More complex examples, based on more sophisticated machine learning techniques and classification techniques are likely to play an increasing role (Cooper 2017).

Fourthly, there are those KO techniques which directly support curiosity which, as noted above, is a powerful force for finding alternative perspectives, breaking filter bubbles, and building understanding. In this respect, another long-established aspect of KO, classification techniques with their ability to show both hierarchical and associative relations, may be of particular importance.

It is worth considering, from the perspective of the issues discussed here, whether any particular form, or theory, or classification may be most appropriate. In particular, pragmatic or critical classification (Hjørland 2017) appears to be something of a two-edged sword. On the one hand, it may support, or reflect, an understanding of the world helpful to an individual or a group in developing understanding, and coincide with their emotional responses to issues; on the other hand, such an organisation may simply reinforce filter bubbles. It may be that systems could be developed to allow a ready comparison of alternative classifications, assisting curiosity-driven explorations of different perspectives. We may also need to consider the status of classical classifications, based on a single agreed picture of the world, and approximating as closely to truth as may be possible. Are these sustainable, at a time when alternative facts seem as viable as any other, and when expertise is said to be said? They appear to be the antithesis of this negative viewpoint. The status and role of classification in the post-truth era seems to be an area in need of thoughtful research.

Fifthly, and finally, it seems to me that to deal adequately with current problems, KO must fully recognise the deep and irreversible changes in the information

environment brought about by the shift to what Floridi categorises as 'infosphere' and 'onlife' in which our digital and physical lives merge, and information, contextual and mobile, is central to our society, and indeed to our humanity (Floridi 2014). This is a long-term and far-reaching challenge, encompassing and going beyond the challenges of the post-truth society, and one in which KO should have a unique position.

Conclusions

There are no quick fixes to the problems set out above. KO cannot solve these problems alone, any more than can the wider LIS discipline; more far-reaching and structural changes, particularly educational, are needed for that. However, KO can play a significant role in improving the situation, using a combination of classic KO concepts and familiar KO practice, integrated with newer technological and organisational environments. In this way, by opposing misinformation and disinformation and promoting understanding, we may justify a claim to be curators of the infosphere.

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References

- Anderson, L., Krathwohl, D. and Bloom, B. (2001). *A Taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives*. New York: Longman.
- Anderson, J. and Rainie, L. (2017). *The Future of truth and misinformation online*. Pew Research centre, Internet and Technology, Oct. 19 2017. Available at <http://www.pewinternet.org/2017/10/19/the-future-of-truth-and-misinformation-online>, accessed 2 January 2018.
- Bawden, D. (2017). *Why LIS doesn't have a quick fix for the post-factual society, and why that's OK* [blog post]. Available at <https://theoccasionalinformationist.com/2017/02/02/why-lis-doesnt-have-a-quick-fix-for-the-post-factual-society-and-why-thats-ok/>, accessed 2 January 2018.
- Bawden, D. and Robinson, L. (2018). Curating the infosphere: Luciano Floridi's Philosophy of Information as the foundation for library and information science. *Journal of Documentation Early Cite*, <https://doi.org/10.1108/JD-07-2017-0096>.
- Bawden, D. and Robinson, L. (2016A). Information and the gaining of understanding. *Journal of Information Science*, 42(3), 294-299.
- Bawden, D. and Robinson, L. (2016B). *A different kind of knowing: speculations on understanding in light of the Philosophy of Information. Paper presented at the 9th CoLIS (Conceptions of Library and Information Science) conference, Uppsala, June 25 2016*. Open access version in the Humanities Commons at <http://dx.doi.org/10.17613/M65046>.

- Beckett, C. (2017). *Dealing with the disinformation dilemma: a new agenda for news media* [blog post]. Available at <http://blogs.lse.ac.uk/mediapolicyproject/2017/12/22/dealing-with-the-disinformation-dilemma-a-new-agenda-for-news-media/>, accessed 4 January 2018.
- Bradley, F. (2017). *Valuing truth in an age of fake* [blog post]. Available at <http://www.rluk.ac.uk/about-us/blog/valuing-truth-in-the-age-of-fake>, accessed 4 January 2018.
- Clark, D. (2017). *Scoping out post-truth issues and how might KO help*. Paper presented at the ISKO UK 2017 annual meeting, presentation available at https://davidclarke.blog/wp/wp-content/uploads/Clarke_ISKO_TRUTH_20170912.pdf, accessed 3 January 2018.
- Cooke, N.A. (2017). Facts: information behaviour and critical information consumption for a new age. *Library Quarterly*, 87(3): 211-221
- Cooper, G. (2017). *False news: a journalist's perspective*. Paper presented at the ISKO UK 2017 annual meeting, presentation available at <http://www.iskouk.org/sites/default/files/CooperSlidesISKO-UK2017-09-12.pptx>, accessed 3 January 2018.
- Corner, J. (2017). Fake news, post-truth and media-political change. *Media, Culture and Society*, 39(7): 1.100-1.107.
- Cuellar, A. (2017). *Combating fake news with metadata* [blog post]. Available at <http://blog.quark.com/2017/12/combating-fake-news-metadata>, accessed 3 January 2017.
- DCMI (2017). *Dublin Core Metadata Initiative: responding to the post-truth phenomenon*. Available at http://www.dublincore.org/news/2017/2017-10-02_responding_to_post_truth_phenomenon accessed 3 January 2018.
- Donne, S. *et al.* (2012). Rapid understanding of scientific paper collections: integrating statistics, text analytics, and visualization. *Journal of the American Society for Information Science and Technology*, 63(2): 2.351-2.369.
- Finch, M. (2017). *Curiosity vs the post-truth world* [blog post]. Available at <https://mechanicaldolphin.com/2017/03/13/curiosity-vs-the-post-truth-world/>, accessed 2 January 2018.
- Floridi, L. (2014). *The fourth revolution: how the infosphere is shaping human reality*. Oxford: Oxford University Press.
- Floridi, L. (2016). Fake news and a 400-year-old problem: we need to resolve the 'post-truth' crisis. *The Guardian* (29 Nov. 2016), available at <https://www.theguardian.com/technology/2016/nov/29/fake-news-echo-chamber-ethics-infosphere-internet-digital>, accessed 2 January 2018.
- Gorichanaz, T. (2016). There's no shortcut: building understanding from information in ultrarunning. *Journal of Information Science*, 43(5): 713-722
- Gorichanaz, T. (2017). Applied epistemology and understanding in information studies. *Information Research*, 22(4): paper 776, available at <http://www.informationr.net/ir/22-4/paper776.html>, accessed 2 January 2018

- Hjørland, B. (2017). Classification. In *ISKO Encyclopedia of Knowledge Organization*, available at <http://www.isko.org/cyclo/classification>, accessed 3 January 2018.
- ISKO (2017). Session 5: *False narratives - developing a KO community response to post-truth issues*. UK Chapter of the International Society for Knowledge Organization, available at <http://www.iskouk.org/content/sessions/session-5-false-narratives-developing-ko-community-response-post-truth-issues>, accessed 3 January 2018.
- Jorotka, M. and Webb, H. (2017). *Spotting the fake* [blog post]. Available at <https://blog.esrc.ac.uk/2017/07/28/spotting-the-fake>, accessed 2 January 2018.
- Madrigal, A.C. (2017). Google and Facebook failed us. *The Atlantic*, (2 Oct. 2017), available at <https://www.theatlantic.com/technology/archive/2017/10/google-and-facebook-have-failed-us/541794>, access 2 January 2018.
- McIntire, G. (2017). *On building a fake news classification model* [blog post]. Available at <https://opendatascience.com/blog/how-to-build-a-fake-news-classification-model>, accessed 3 January 2018.
- O'Leary, M. (2017). Fact-checkers resist alternative facts. *Information Today*, (Oct. 2017) 18-19.
- Polizzi, G. (2017). *Critical digital literacy: ten key readings for our distrustful media age* [blog post]. Available at <http://blogs.lse.ac.uk/mediapolicyproject/2017/12/15/critical-digital-literacy-ten-key-readings-for-our-distrustful-media-age>, accessed 2 January 2018.
- Poole, N. (2017). *Why 'facts matter': evidence, trust and literacy in a post-truth world*. Paper presented at the ISKO UK 2017 annual meeting.
- Quinn, B. (2016). *Helping to fix the fake news problem with metadata*. Available at <https://medium.com/@brendanquinn/weighing-into-the-fake-news-problem-with-metadata-ebe067fac0e7>, accessed 3 January 2018.
- Requarth, T. (2017). Scientists, stop thinking explaining science will fix things. *Slate*, (19 Apr. 2017), available at http://www.slate.com/articles/health_and_science/science/2017/04/explaining_science_won_t_fix_information_illiteracy.html, accessed 2 January 2018.
- Robinson, L. (2016). *Documentation in the post-factual society: or what LIS did next, after Brexit* [blog post]. Available at <https://thelynxblog.com/2016/07/17/documentation-in-the-post-factual-society>, accessed 2 January 2018.
- Russell, B. (1942). *The Art of philosophizing and other essays*. Girard KS: Haldeman-Julius, p. 5.
- SimonXIX (2017). *An open letter to the Sunday Times*. Available at <https://medium.com/@SimonXIX/an-open-letter-to-the-sunday-times-bf815f0c01d0>, accessed 3 January 2018.
- Tomchak, A-M (2017). Algorithms are screwing us over with fake news but could also fix the problem. *Mashable*, (5 Oct. 2017), available at <http://mashable.com/2017/10/05/artificial-intelligence-algorithm-neva-labs>, accessed 2 January 2017.

Wardle, C. and Derakhshan, H. (2017). *Information disorder: toward an interdisciplinary framework for research and policy making*. Council of Europe report DGI (2017)09, available at <https://firstdraftnews.com/wp-content/uploads/2017/11/PREMS-162317-GBR-2018-Report-désinformation-1.pdf?x29719> accessed 4 January 2018.

Foundations and Methods for Knowledge Organization

Axel Ermert

Among dictionaries, reference works and concept systems: can the terminology in International Standard ISO 5127:2017 contribute to Knowledge Organization?

Abstract

The purpose of this paper is to introduce the main features of the new International Standard ISO 5127:2017 “Foundation and vocabulary of information and documentation” and to examine whether, and how, it could contribute to current knowledge organization (KO). Equally, this paper contains some considerations with regard to commonalities between KO and “terminology” and to principles and structure of both types of systems. ISO 5127 is, at the same time, a companion document for ISO/TC 46 “Documentation”, and thus also serves as its main reference document, systematically bringing together the terminology developed, required and used for the work undertaken by that committee.

The task of ISO 5127:2017 is

- to provide basic components for a descriptive outline of the information sector (field) and the procedures with which society handles predominantly scientific information work and its information processes;
- thus, also to contribute to KO systems and procedures.

In some of its functions “terminology” is a meta-tool, an instrument that helps in the creation, and maintenance, of other systems such as a KO system.

This paper is not so much a study of epistemology or the general foundations of KO systems as a look at how the domain “information field” is reflected in the concept system of a “terminology”, how it is structured and how this terminology relates to (other) KO systems.

The need for “terminology”

An arbitrarily picked example demonstrates directly the need for terminology and definitions, while at the same time indicating how problematic this area is:

“As far as possible the terms used in the model to identify entities or objects, their attributes, and their relationships have been derived directly from the code itself. The definitions for the terms used to identify entities, etc. have also been derived, to the extent possible, either from the glossary or from the wording of the rules themselves, in some cases in a modified form. Where definitions could not be derived from the code itself, they have been derived from other sources such as the *ALA Glossary of Library and Information Science*, and the *Functional Requirements for Bibliographic Records*. In other instances definitions have been developed specifically for the purposes of the model.” (The Logical Structure ... 1999, p. 2)

Right at the beginning of their ground-breaking report on new (and international) cataloguing rules, the renowned information expert Tom Delsey and his colleagues remind us of the fundamental need for conceptual clarity, and spelt-out definitions, in any undertaking in the information field and in KO. Only on that basis is it possible to conceive projects, carry out tasks and ensure some mutual understanding of people working together on an issue. At the same time, it is clear that “understanding” and