



# Facets of Knowledge Organization

*A tribute to Professor Brian Vickery, 1918–2009*

*University College London 4–5 July 2011*

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## Conference programme with abstracts

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The second biennial conference of the UK Chapter of ISKO (International Society for Knowledge Organization) honours the life and achievements of Brian C Vickery, one of the great pioneers in our field.

From his 1948 essay on Bradford's law of scattering to a 2008 posting on his website *On knowledge organisation*, Vickery provided us with a tremendous legacy of insights, still relevant today.

According to Vickery, 'Our tasks are to make knowledge (whether organised or unorganised) available to those who seek it, to store it in an accessible way, and to provide tools and procedures that make it easier for people to find what they seek in those stores.' During *Facets of Knowledge Organization* we shall discuss the latest progress with all these tasks.

<http://www.iskouk.org/conf2011/>

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# ISKO-UK 2011 conference programme at a glance

Monday 4 July

08.30	<b>Registration</b>	
10.00	<b>Conference Opening and Welcome</b>	
10.15	<b>Session 1 Inspired by Brian C Vickery</b> <i>Chair: Vanda Broughton</i> <b>Keynote address</b> by <b>Stephen E Robertson</b> <i>On retrieval system theory</i> [45 mins] <b>Claudio Gnoli</b> <i>Vickery's late ideas on classification by phenomena and activities</i> [40 mins]	
11.40	<b>Coffee/tea break and posters</b> <b>11.50 – 12.10 Sponsor demonstration by Synaptica (Dave Clarke)</b> <i>Semantic knowledge organization system: from whiteboard to production in 20 minutes</i>	
12.20	<b>Session 2 Exploring relationships</b> <i>Chair: Rebecca Green</i> <b>D Grant Campbell</b> <i>Revisiting Farradane's relational indexing in a consumer health context</i> [35 mins] <b>Marianne Lykke, Anne Lyne Høj, Line Nørgaard Madsen, Kora Golub, Doug Tudhope</b> <i>Tagging behaviour with support from controlled vocabulary</i> [20 mins]	
13.00	<b>Lunch break</b>	
14.15	<b>Session 3A The big schemes – LCSH and DDC</b> <i>Chair: David Bawden</i> <b>Rebecca Green, Joan S Mitchell</b> <i>Computer-assisted abridgment of a classification scheme</i> [20 mins] <b>Gary Steele</b> <i>The wisdom of the cataloguers: LCSH, indexer inconsistencies and collective intelligence</i> [20 mins] <b>Simon Spero</b> <i>What, if anything, is a subdivision?</i> [20 mins]	<b>Session 3B Perspectives on resource discovery</b> <i>Chair: Bob Bater</i> <b>Lucy Bell, Anat Vernitski</b> <i>Seemingly gliding: the power of metadata in academic resource discovery systems</i> [20 mins] <b>Kathryn La Barre</b> <i>Traditions of facet theory, or a garden of forking paths?</i> [20 mins] <b>Maja Žumer, Marcia Lei Zeng</b> <i>Modelling knowledge organization systems and structures – a discussion in the context of conceptual data models</i> [20 mins]
15.15	<b>Coffee/tea break and posters</b> <b>15.25 – 15.45 Sponsor demonstration by Synaptica (Dave Clarke)</b> <i>Semantic knowledge organization system: from production to publication in 20 minutes</i>	
16.00	<b>Session 4 NKOS special session, co-organized by the NKOS European network: What role can KOS play in information retrieval applications?</b> <i>Chair: Philipp Mayr</i> <b>Vivien Petras</b> <i>Knowledge organization systems and their consequences for information retrieval</i> [40 mins] <b>Marianne Lykke, Susan Price, Lois Delcambre</b> <i>How doctors apply semantic components to specify search in work-related information retrieval</i> [20 mins] <b>Elin K Jacob, Nicolas L George, Gary Arave</b> <i>'And the winner is...' The perils and pitfalls of rank order analysis</i> [40 mins]	
17.30	<b>Close of working sessions, Day One</b>	
18.00	<b>Reception and buffet</b> [2 hours]	

## Tuesday 5 July

08.30	<b>Registration</b>	
09.00	<b>Introduction to posters</b>	
09.15	<b>Session 5 Organizing information: behaviour and development</b> <i>Chair: Alan Gilchrist</i> <b>Keynote address</b> by <b>Amanda Spink</b> <i>Information organizing: an evolutionary and development framework</i> [45 mins] <b>Elizabeth Orna</b> <i>Classification and visualization of knowledge; light from a forgotten past</i> [20 mins] <b>Patrick Lambe</b> <i>Knowledge organization systems as enablers to the conduct of science</i> [30 mins]	
10.50	<b>Coffee/tea break and posters</b> <b>11.00 – 11.20 Sponsor presentation by PoolParty (Helmut Nagy)</b> <i>SKOS thesaurus management and linked data</i>	
11.40	<b>Session 6 The legacy of Brian C Vickery</b> <i>Chair: Claudio Gnoli</i> <b>Lyn Robinson, David Bawden</b> <i>Brian Vickery and the foundations of information science</i> [20 mins] <b>Joseph T Tennis</b> <i>Comparative modeling of Vickery's faceted classification and the oeuvre of S R Ranganathan</i> [40 mins] <b>Vanda Broughton</b> <i>Brian Vickery and the Classification Research Group: the legacy of faceted classification</i> [20 mins]	
13.00	<b>Lunch break</b>	
14.00	<b>Session 7A — Making it work in practice</b> <i>Chair: Leonard Will</i> <b>James Howard, Silver Oliver</b> <i>Enhancing the BBC's news and sports coverage with an ontology-driven information architecture</i> [40 mins] <b>Elaine Ménard, Margaret Smithglass</b> <i>Babel revisited: a taxonomy for ordinary images in a bilingual retrieval context</i> [20 mins] <b>Fran Alexander</b> <i>Building bridges: mapping diverse classifications for a seamless user navigation experience</i> [20 mins]	<b>Session 7B — Facets and folksonomies</b> <i>Chair: Judi Vernau</i> <b>Louise F Spiteri</b> <i>Faceted navigation of social tagging applications</i> [40 mins] <b>Stella Dextre Clarke</b> <i>ISO 25964: a standard in support of KOS interoperability</i> [20 mins] <b>Elise Conradi</b> <i>Modeling a folksonomy with the postulational approach to facet analysis</i> [20 mins]
15.20	<b>Coffee/tea break and posters</b> <b>15.30 – 15.50 Sponsor presentation by PoolParty (Florian Kondert)</b> <i>Semantic search and metadata mapping based on thesauri</i>	
15.40	<b>Session 8 Special subjects: music and mathematics</b> <i>Chair: David Penfold</i> <b>Deborah Lee</b> <i>Faceted music: towards a model of music classification</i> [20 mins] <b>Jean Debaecker, Widad Mustafa El Hadi</b> <i>Music indexing and retrieval: evaluating the social production of music metadata and its use</i> [20 mins] <b>Patrick Ion, Wolfram Sperber</b> <i>Some facets of knowledge management in mathematics</i> [20 mins]	
17.30	<b>Close of conference</b>	

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# Sponsor presentations

Two of the conference sponsors – PoolParty and Synaptica – will run demos and presentations during refreshment breaks in the conference, in the main lecture room, at the times shown. They have provided the synopses below.

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Dave Clarke, Synaptica  
Monday 11:50–12:10

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## Semantic knowledge organization system: from whiteboard to production in 20 minutes

How do you get started on a project to build a Knowledge Organization System (KOS)? This 20-minute presentation will provide a practical demonstration on how easily and rapidly ideas can be moved from whiteboard designs into live production. During the presentation multiple facets will be created and woven together using a palette of customized semantic relationships.

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Dave Clarke, Synaptica  
Monday 15:25–15:45

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## Semantic knowledge organization system: from production to publication in 20 minutes

How can you publish and promote your Knowledge Organization System (KOS) within the enterprise or the World Wide Web? This 20-minute presentation will provide a practical demonstration on how easily and rapidly KOS work-in-progress can be moved from technical production to end-user publication. During the presentation, facets, sub-facets and even individual attributes will be selected from a master KOS and then published to a live Web server for public, user-friendly access.



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Helmut Nagy, PoolParty  
Tuesday 11:00–11:20

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## SKOS thesaurus management and linked data

Building and maintaining thesauri are complex and laborious tasks. PoolParty is a thesaurus management tool for the semantic web, which aims to ease the creation and maintenance of thesauri by utilizing linked open data (LOD), text-analysis and easy-to-use GUIs. PoolParty also supports the publication of linked data.

Helmut Nagy from the PoolParty team will explain how one can benefit from linked data and will demonstrate how thesauri can be managed collaboratively within a linked data environment. (More information: <http://www.poolparty.biz/>)

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Florian Kondert, PoolParty  
Tuesday 15:30–15:50

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## Semantic search and metadata mapping based on thesauri

Semantic search is an often quoted technology which promises to improve search in enterprises and on the Web. Let's take a closer look at semantic search: How can you benefit from it and what has to be done to establish such an application? What role do thesauri play and how can different data sources be integrated with PoolParty to make them searchable in a 'semantic way'?

Florian Kondert from the PoolParty team will give an overview of various search scenarios in his talk and will demonstrate how thesauri can help to realise semantic search engines. (More information: <http://www.poolparty.biz/>)

Day One, 10:15

Chair: Vanda Broughton

KEYNOTE ADDRESS

Stephen E Robertson

**On retrieval system theory**

This paper re-reviews Vickery’s book *On retrieval system theory*, first published 50 years ago, and discusses the changing nature of theoretical work on information retrieval and the possibility of developing a general theory of IR. Stephen Robertson writes:

*‘What kinds of theory or theories do we need for the field of information retrieval?’ Brian Vickery’s book whose title I have purloined was first published in 1961; in the preface he makes the following disclaimer: ‘There is as yet no unified theory of retrieval systems’. I have made the same statement many times myself, and it is as true now as it was a half-century ago. The number of papers published in the field of information retrieval, in every year of the first decade of the third millennium, would astonish the Brian Vickery of 1961, and many of these papers appeal to theoretical arguments of various more-or-less formal kinds. But can we expect, and do we need or want, a unified theory? In this talk I will attempt some discussion of these issues.*

*Stephen E Robertson – Microsoft Research Laboratory, Cambridge, UK*

Claudio Gnoli

**Vickery’s late ideas on classification by phenomena and activities**

Classification was always a major interest for Brian Vickery. In his last years he contributed to the theoretical debate on classification with original ideas that are not well known yet, as some of them were consigned to ephemeral Web pages or private discussion. This paper attempts to report them and to discuss their implications for the current theory of knowledge organization.

Vickery’s proposals especially concern: application of the theory of integrative levels to classification as recommended by the Classification Research Group; the various dimensions of knowledge that are involved in the steps ‘from the world to the classifier’; progressive identification by science of phenomena within reality; interplay between the phenomena studied and the human activities providing the context and purpose for studying them; identification of facets of activities as well as facets of phenomena. It is concluded that these ideas offer a substantial contribution to the theory of knowledge organization, and thus should be known, discussed and further developed. industry body. Instead, it requires a bold leap from an informed theoretical base to an implementable strategy.

*Claudio Gnoli – Science and Technology Library, University of Pavia, Italy*

Day One, 12:20

Chair: Rebecca Green

D Grant Campbell

### Revisiting Farradane's relational indexing in a consumer health context

Farradane's relational indexing system uses a psychological paradigm to establish a matrix of relationships between concepts, based on axes of association and discrimination. While the system has never been widely adopted in indexing, it provides a useful basis for the discourse analysis of consumer health information, particularly in relation to Alzheimer's Disease. Using Farradane's relational operators to analyze textual information provided both by medical professionals and by patients suffering from Alzheimer's Disease, this study found that gaps in medical knowledge about the causes of Alzheimer's manifest themselves in the matrix as a tension between association and functional dependence. The testimony of Alzheimer's patients, on the other hand, showed a tension between the self-activity and dimensional relationships: between intransitive activities, on the one hand, and a strong desire to tell the stories of their lives.

Findings of the study suggest that Farradane's relational system has the potential to identify important gaps between professional and consumer health information vocabularies, and to enhance the embedded relationships in consumer health Web information systems.

*D Grant Campbell – Faculty of Information and Media Studies, University of Western Ontario, Ontario, Canada*

Marianne Lykke  
Anne Lyne Høj  
Line Nørgaard Madsen  
Koraljka Golub  
Doug Tudhope

### Tagging behaviour with support from controlled vocabulary

The paper investigates how knowledge structures from a controlled vocabulary affect tagging. The study is a comparative analysis of tags assigned in two tagging systems – a simple tagging system (control system) that provides suggestions from two tag clouds (*all users* tags and *my* tags), and an enhanced tagging system (experimental system) that additionally offers suggestions from the Dewey Decimal Classification system (DDC).

In the experimental study, 28 political students completed four tagging tasks, each comprising 15 documents. The focus was to examine how suggestions from the enhanced tagging system affect tags as regard tag specificity, exhaustivity, and novelty. Generally, there were no big differences between assigned tags from the two systems. The largest difference was a higher degree of tag specificity in the enhanced system indicating that suggestions from a controlled vocabulary might help taggers in being more specific in their tagging, allowing more precise information searching based on user tags. In addition, the results indicate that structured controlled suggestions might encourage taggers to add synonym variations enhancing the variety and number of access points. Furthermore, controlled vocabularies might be useful for automatic spell checking. Future study should explore in what direction the different kinds of suggestions lead the tagger and whether it is possible to identify scope or patterns between related tags from the two systems.

*Marianne Lykke – Aalborg University, Denmark*

*Anne Lyne Høj – Royal School of Library and Information Science, Denmark*

*Line Nørgaard Madsen – Royal School of Library and Information Science, Denmark*

*Koraljka Golub – UKOLN*

*Doug Tudhope – University of Glamorgan*

Day One, 14:15

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Rebecca Green  
Joan S Mitchell

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Chair: David Bawden

### Computer-assisted abridgment of a classification scheme

Work is under way to define and test a model for semi-automatic abridgment of the Dewey Decimal Classification (DDC) system. This abridgment is guided by data in the current full and abridged editions and by principles and practices that inform development and maintenance of the classification. The model is immediately applicable to the development of the next abridged edition of the DDC; other applications include derivation of different views of the DDC and management of multilingual content at various levels of development.

*Rebecca Green and Joan S. Mitchell – OCLC Online Library Computer Center, Inc., USA*

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Gary Steele

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### The wisdom of the cataloguers: LCSH, indexer inconsistencies and collective intelligence

The process of subject analysis and Library of Congress Subject Heading assignment is, despite the availability of rules and standards, a subjective one. Disagreements and inconsistencies between cataloguers regarding the correct Library of Congress Subject Headings for a given resource are widespread. This paper attempts to address the problem of these indexer inconsistencies by utilising the wisdom of the crowd. The various headings suggested by different cataloguers, for a particular resource from a large number of library catalogues, can be collated to create a coherent, valid, and consistent set of Library of Congress Subject Headings that represent the collective wisdom of the cataloguers.

*Gary Steele – Glasgow Caledonian University*

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Simon Spero

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### What, if anything, is a subdivision?

Much has been written about the costs and benefits of using pre-coordinated headings when indexing documents. However, to date there have been few attempts at specifying a formal semantics for such systems, and little study of how well the intended meanings of these headings correspond to the meanings understood by both end users and professional library staff.

In this paper I discuss some possible interpretations of pre-coordinated headings in the Library of Congress Subject Headings. I review previous studies of end user understanding of subdivided subject headings. These studies raise questions as to how well the intended meanings of these headings are understood by professional librarians and end users. I note methodological issues that may limit the validity of the results and suggest follow-up studies to address these limitations.

Finally, I suggest extensions to the W3C ontology for Simple Knowledge Organization Systems (SKOS) to support modeling subdivided headings. I also suggest how concepts modeled using these extensions can be related to classes in a corresponding ontology.

*Simon E Spero – School of Information and Library Science, University of North Carolina at Chapel Hill, USA*

Day One, 14:15

Chair: Bob Bater

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 Lucy Bell  
 Anat Vernitski
 

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### Seemingly gliding: the power of metadata in academic resource discovery systems

Creators of resource discovery systems are at a turning point in development: their systems must satisfy the users' needs for the delivery of high-quality, academically-rigorous content, while also providing the most straightforward, Google-like interfaces possible. The role of metadata in this scenario becomes paramount as users enter a world which seems serendipitous, but which is still subject to academic rigour, relevance and comprehensiveness. Ironically, such a system, necessarily supported by high-quality metadata, increasingly conceals them, thus lowering their profile in the user's mind, and their importance becomes even more camouflaged to the user community. Without them, however, there is no system.

This paper explores this dichotomy, describing a vision for resource discovery which creates a seamless journey between related, yet disparate, resources. It moves on to look at a case study of a single tool: the HASSET thesaurus, developed at the UK Data Archive. This tool's journey from an inhouse-developed thesaurus to the lynch-pin of many online services is described in detail. Lastly, the paper takes the theory of achieving focused results from a simple interface and, using HASSET, applies it to an existing service: the Economic and Social Data Service (ESDS). Metadata is shown to be the essential – and yet increasingly invisible – force at work in effective resource discovery systems.

*Lucy Bell and Anat Vernitski – UK Data Archive, University of Essex*

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 Kathryn La Barre
 

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### Traditions of facet theory, or a garden of forking paths?

This socio-historical inquiry contrasts historical and contemporary facet theory. While examining vagaries in terminology for key concepts such as facet, facet analysis, and facet theory, as used by different researchers and different schools of thought, the author concludes with a call for the creation of operational definitions and functional requirements to enhance, amplify or extend current practices.

*Kathryn La Barre – Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, USA*

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 Maja Žumer  
 Marcia Lei Zeng
 

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### Modelling knowledge organization systems and structures – a discussion in the context of conceptual and data models

In the last few decades, knowledge organization systems (KOS), especially thesauri, classification schemes and lists of subject headings, have largely followed or conformed with the established data models defined by standards, recommendations or best practices. This long list contains some widely used models, such as ISO5964 Part 1, ISO2788, Z39.19, BS 5723 and BS 6723, (Dextre Clarke, 2008) IFLA Principles Underlying Subject Heading Languages (SHLs), and MARC 21 Format for Classification Data.

The FRSAD (Functional Requirements for Subject Authority Data) conceptual model is the third member of the FRBR family, developed under the auspices of IFLA. The report was approved in 2010 and will be published in 2011. FRSAD is a general conceptual model that focuses on the subject relationship and therefore provides a theoretical framework for all KOS and their data models. In addition, it also assists in the assessment of the potential for international sharing and (re)use of subject authority data both within the library sector and beyond.

In this paper FRSAD is compared to SKOS and SKOS XL as data models (with implementation examples).

*Maja Žumer – University of Ljubljana, Slovenia  
 Marcia Lei Zeng – Kent State University, USA*

Day One, 16:00

Chair: Philipp Mayr

Vivien Petras

## Knowledge organization systems and their consequences for information retrieval

Traditionally, research on knowledge organization systems (KOS) and information retrieval discussed the relative advantages or disadvantages of using controlled vocabularies versus free-text or intellectual indexing versus automatic indexing methods for indexing and search. Experiments and case studies variously showed the superiority of either approach without reaching a final conclusion on this seemingly basic question. As full-text indexing has become more possible and now prevalent, the discussion of the relative merits of KOS – not only as substitute but in combination with full-text – was not settled but continued with new challenges. With the advent of the Semantic Web, KOS (now appearing as ontologies) became important tools in new information retrieval applications and were pushed once again to the research forefront. With different disciplines working in the field, the terminology around KOS has become more and more ambiguous up to the point that tracing research in the literature is difficult – ironically something that traditional KOS have always tried to mitigate.

This paper summarizes recent discussions of the impact of KOS on information retrieval and attempts to show and unify different research strands from library science research on subject indexing, information retrieval and the Semantic Web. Whereas earlier impact studies on retrieval resulted in clearly measurable outcomes (for example changes in precision/recall), recent use of KOS in Semantic Web applications or other information systems has switched from pure search scenarios to exploration (browse) and contextualization, for which clear (and calculable) evaluation or quality standards and benchmarks do not exist.

*Vivien Petras – Berlin School of Library and Information Science, Humboldt-Universität zu Berlin, Germany*

Marianne Lykke  
Susan Price  
Lois Delcambre

## How doctors apply semantic components to specify search in work-related information retrieval

Workplace searching is often context-specific and targets a ‘right answer’ within some domain-specific aspect of the search topic. We have developed the semantic component (SC) model that allows searchers to specify a search within context-specific aspects of the main topic of documents. The goal of our study was to gain insight into how family practice physicians at sundhed.dk, a national healthcare portal in Denmark, applied the SC model to formulate queries to solve work-related search tasks. The results showed that doctors used the model purposively when choosing search facets and search concepts. They were relatively consistent in their use. The findings provide promising evidence of the model’s potential usefulness.

*Marianne Lykke – Aalborg University, Denmark*

*Susan L Price – Microsoft Corporation, USA*

*Lois L M Delcambre – Portland State University, USA*

Elin K Jacob  
Nicolas L George  
Gary Arave

## ‘And the winner is...’ The perils and pitfalls of rank order analysis

Folksonomy research has not developed a standardized toolbox of analytical strategies, generally relying on descriptive methods to investigate the structure, composition and evolution of tagging vocabularies. Rank order (RO) based on tag frequency has been used to study various aspects of folksonomies: how well tags categorize resources (Brooks & Montanez, 2005; Kipp & Campbell, 2006) and identification of tagging patterns (Munk & Mork, 2007), and trends in user interest (Ding et al., 2009). However, results of simple RO may be misleading. For example, a tag whose frequency of use increases across two years may actually account for a smaller percentage of total tags assigned in the second year, or a tag whose rank declines across two years may actually account for a greater percentage of tags in the second year than the first. This research addresses the validity of assumptions underlying RO analysis by investigating how it correlates with both frequency and percentage of tag frequency across various time periods.

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Effects of RO by frequency of tag occurrence, taggers and URLs were investigated in a targeted sample collected from delicious.com for 2004 through 2007. After removing all singleton tags, the dataset consisted of 7,863 URLs to which 1,804,379 tags had been assigned by 186,075 taggers. Because of the non-normal distribution of tag frequency data, non-parametric statistical tests were used to calculate correlations. Results of the analysis found that the correlation between RO and frequency was high, but that correlation between RO and percentage of actual use was problematic.

*Elin K. Jacob, Nicolas L. George and Gary Arave – School of Library & Information Science, Indiana University, USA*

## Session 5

## Organizing information: behaviour and development

Day Two, 09:15

Chair: Alan Gilchrist

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KEYNOTE ADDRESS:  
Amanda Spink

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### Information organizing: an evolutionary and developmental framework

Information behaviour has emerged as an important aspect of human life; however, our knowledge and understanding of it is incomplete and underdeveloped scientifically. Our understanding of information behaviour and the sub-process information organizing behaviour is largely contemporary in focus. In this presentation Professor Spink discusses an evolutionary and developmental framework for information behaviour and information organizing from her recent book *Information Behaviour: An Evolutionary Instinct* (2010, Springer) by incorporating related findings, theories and models from evolutionary psychology, cognitive archaeology, cognitive neuroscience and developmental psychology. In her presentation, she argues that information behavior and information organizing are important instinctive socio-cognitive abilities for all humans that can only be fully understood with an evolutionary and developmental perspective.

Professor Spink's presentation addresses four important research questions. Firstly, what is the evolutionary, biological and developmental basis for information behaviour and information organizing behaviour? Secondly, what is the role of instinct versus environment in shaping information behaviour and information organizing behaviour? Thirdly, how have information behaviour and organizing capabilities evolved and developed over human species? Fourthly, when and how do information behaviour and in particular information organizing abilities emerge in young children? An evolutionary and developmental approach lays the foundation for a more holistic perspective on information behaviour and information organizing behaviour, and opens many new research directions.

*Professor Amanda Spink – Department of Information Science, Loughborough University*

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Elizabeth Orna

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### Classification and visualization of knowledge: light from a forgotten past

This paper is based on an ongoing project to investigate how knowledge has been visualized in different times and places. Its focus is on how, over the fourth to the sixteenth centuries in Europe, literate societies used mental images to support memory in visualizing and classifying the knowledge embodied in texts, in order to make it part of their own knowledge store, to organize it for retrieval, and finally to create and communicate new knowledge. In this paper I:

- define information and knowledge and their visualization, and propose a model of their relationship and the processes involved;
- identify critical stages in the interaction between humans and technologies to support these activities;
- note close analogies between earlier practice and what would today be termed information design;
- suggest the relevance of these ideas and practices to today's problems of organizing and communicating knowledge, and propose some practical approaches to making use of them.

*Elizabeth (Liz) Orna – Orna Information and Editorial Consultancy*

## Knowledge organization systems as enablers to the conduct of science

The sophistication of knowledge organization systems (KOS) has evolved rapidly over the past thirty years, largely driven by information technology innovations. Two key assumptions have been (a) that KOS-work is the preserve of information professionals acting as skilled intermediaries, and (b) that it is largely focused on enabling the finding and discovery of information. This paper challenges both assumptions with reference to the conduct of science in the 21st century, by describing the ways in which access to KOS skills and tools is already broadening beyond information professionals to scientists, and by describing how knowledge organization systems enable sense-making of trends within science and new knowledge creation, beyond simple access and discovery roles. It closes with remarks on the implications for information professionals engaged in KOS-related work.

*Patrick Lambe – Straits Knowledge, Singapore*

### Session 6

Day Two, 11:40

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Lyn Robinson  
David Bawden

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Joseph T Tennis

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## The legacy of Brian C Vickery

Chair: *Claudio Gnoli*

### Brian Vickery and the foundations of information science

The paper examines B.C. Vickery's contributions to the continuing debate on the nature of the information sciences as academic disciplines and domains of professional practice, focusing on ten main topics: what is information science; information science as a field of study; the core of information science; information science and other disciplines; cognate information disciplines; information science: theory and practice; education for information science; the importance of the user; the place of knowledge organisation; and information science, looking backward and forward.

*Lyn Robinson and David Bawden – Department of Information Science, City University London*

### Comparative modeling of Vickery's faceted classification and the oeuvre of S. R. Ranganathan

B.C. Vickery and S. R. Ranganathan both advanced methods of creating schemes for classification and facet analysis of documents. In his accessible and well-written 1960 text, Vickery acknowledges his debt, and indeed the debt owed by the CRG, to Ranganathan's work. Yet, because of the time of this writing, and its purpose, we see a very different view of the theory of faceted classification from Vickery, when compared to the overall oeuvre of S. R. Ranganathan (beyond the 1967 *Prolegomena*). And it is Vickery's 1960 and 1966 works, not Ranganathan's, that are often used as the introduction to (and often the end of the education in) faceted classification and facet analysis.

The question surfaces, is there more than one conception of faceted analysis and faceted classification? We must take as an assumption that neither Vickery nor Ranganathan are wrong in their conception, but what if they differ? Others have examined the question of the definition of faceted classification, often with an eye to contemporary interpretations of facet analysis, not as an explicit comparison between these two bodies of thought (e.g., La Barre, 2004; see also *Axiomathes* 18(2)).

There are several commonalities that obtain between Vickery and Ranganathan which can be discerned by the informed reader. For instance, there are commonalities in how Vickery and Ranganathan talk about citation order. However, Vickery's discussion omits many details contained in Ranganathan's. This brings us to our question. What does Vickery's theory of faceted classification look like compared to Ranganathan's? Does Vickery create a different theory, and hence lineage, of faceted classification in the 1960s?

In an effort to make sense of both Ranganathan's work and Vickery's we modeled the process involved in classification using the IDEFo (Integrated Definition for Function Modeling) formalism. This allows us to see five distinct parts of the classification process: actions, inputs, outputs, mechanisms, and constraints. When we model theories of

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classification this way we can then compare them by asking whether or not they contain the same actions, inputs, outputs, mechanisms, and constraints. This allows us to see how the conceptions held by Vickery and by Ranganathan are similar, and how they are different.

This work is ongoing, but preliminary analysis shows that while there is some cross-over, Vickery's exposition of faceted classification and facet analysis were more parsimonious than Ranganathan's. This leaves us with questions about decision-making when proceeding through the process of facet analysis and creating schemes for faceted classification. Similarly, Ranganathan's work is left undone (primarily with rules for interpreting postulates and principles, but there are other places as well).

We will present the findings on the modeling of these two conceptions of faceted classification and facet analysis. We propose two ways to frame this discussion: by describing (1) what commitments we make when we assume a common model of facet analysis and classification, and (2) what we assume from identifying distinct theories of faceted classification and facet analysis. We will also identify gaps in our understanding of these two conceptions, as well as strengths and weaknesses of the modeling technique.

*Joseph T Tennis – Information School, University of Washington*

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Vanda Broughton

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## **Brian Vickery and the Classification Research Group: the legacy of faceted classification**

This paper considers the impact of faceted classification as it developed in the United Kingdom; it examines the origins of the Classification Research Group and Brian Vickery's unique contribution to it, and the way in which faceted classification today has fulfilled the objectives of the CRG's 1955 manifesto to make 'faceted classification the basis of all information retrieval'.

*Vanda Broughton – Department of Information Studies, University College London*

## **Session 7a**

*Day Two, 14:00*

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James Howard  
Silver Oliver

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## **Making it work in practice**

*Chair: Leonard Will*

### **Enhancing the BBC's news and sports coverage with an ontology-driven information architecture**

In Tim Berners Lee's original proposal for the Web (retrieved from <http://info.cern.ch/Proposal.html>) he gave us the basic ingredients to build the web of documents as we experience it today. Due to its simplicity, the Web became a victim of its own success as we were soon overwhelmed. At this point information architects were employed to group together documents into manageable piles using a variety of techniques to group sets of documents. The problem with this approach is that if we start out focusing on documents, our sites turn out document-centric and this is not how users think about the world. People are interested in things not documents.

This leads us to move away from a document-orientated approach to Web development to a thing-focused one, and with this move comes the need for new tools and approaches to information architecture. This includes the use of domain-driven design to understand the things and relationships in a problem space and the use of open linked data sources to populate these models. This will be illustrated with case studies from the BBC's Wildlife Finder and the World Cup project.

In summary, Semantic Web-like thinking changes the way we build Web sites. Firstly it focuses us on real-world things and the relationships between them, secondly it introduces a culture of building with open vocabularies to add context and links that create richer, more useful and more findable digital products..

*James Howard – Metadata and Location Services, BBC  
Silver Oliver – News and Knowledge, BBC*

## **Babel revisited: a taxonomy for ordinary images indexing in a bilingual retrieval context**

With the large volume of digital images now accessible on the World Wide Web, users searching for images can be overwhelmed by many factors. Too many available images, images indexed with an incomprehensible vocabulary or one that is too specialized to be useful are but a few examples of issues leading to frustration. In addition, language barriers still prevent Web users from retrieving the images they need.

This contribution presents the preliminary results of a study proposing to explore the behaviours of image searchers from four different linguistic communities. The purpose of this preliminary study is to examine queries formulated by image searchers to learn about the terminology used and evaluate how this terminology can be eventually incorporated into the development of a bilingual taxonomy for digital image indexing. Forty participants from four different linguistic communities (English, French, Chinese and Russian native speakers) were asked to write the queries they would use to retrieve ten images that were shown to them consecutively. Then they were invited to fill out a questionnaire on their behaviours as an image searcher on the Web.

The results of this research allowed the acquisition of knowledge of user terminology standards and an assessment of how that terminology might be integrated in the development of a bilingual taxonomy for improved indexing of ordinary digital images. Moreover, since language barriers regularly prevent users from easily accessing information of all kinds, the bilingual taxonomy will constitute a clear benefit for image searchers who are not overly familiar with images indexed in English, which is still the dominant language of the Web.

*Elaine Ménard and Margaret Smithglass – School of Information Studies, McGill University, USA*

## **Building bridges: mapping diverse classifications for a seamless user navigation experience**

This paper describes a BBC project to unify Archive and Production workspaces, during which numerous issues with managing different types of metadata and Knowledge Organisation Systems (KOSs) were encountered. Integrating diverse content silos requires bringing together not simply the assets, but also the metadata used to manage those assets. The paper summarises the theoretical background to the project, the BBC's 'information ecosystem', and the user research and requirements-gathering exercises undertaken.

Much work on developing metadata crosswalks has been at the heading or label level, and not based on semantic analysis of the content of the labelling or description. However, such semantic analysis needs to be undertaken when mapping diverse taxonomies, thesauri, and keyword lists and, in practice, often needs to balance preservation of local or specialised terminology with accessibility for general users. Just as metadata about content permits the organization of that content, so metadata about metadata (parametadadata, or meta-metadata) permits the organization of metadata, enabling end users to make informed browse and navigation choices. Increasingly, in order to integrate content, different KOSs, such as taxonomies and ontologies, need to be related.

The paper concludes by summarising the ways in which problems that arose during the integration project were resolved, and how policies for managing parametadadata, subjective metadata, and semantic-level mapping were developed.

*Fran Alexander – BBC Information and Archives*

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Louise F Spiteri

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### Faceted navigation of social tagging applications

The goal of this paper is to conduct an analysis of seventeen existing and proposed methodologies for the use of facets in social tagging applications, with particular emphasis placed on the extent to which these methodologies address the following questions:

- How do you choose facets that can apply generally to all subjects in social tagging applications
- How many facets would suffice to cover site members' needs?
- Who should choose the facets?
- How do you ensure that the facets chosen reflect the needs of the site members?
- How do you maintain the facets and impose quality control over them?

Results of this analysis indicate that these methodologies provide insufficient guidelines for the choice, evaluation, and maintenance of the facets.

An underlying problem in many of these studies is their lack of clear definitions of what constitutes a facet. The lack of emphasis on the mutual exclusivity of facets is particularly troublesome, since it is perhaps this attribute that would determine the effectiveness of facets in a social tagging application. Most of the proposed methodologies do not address how facets are to be derived or maintained.

A proposed framework for a more rigorous approach to the incorporation of facets into social tagging applications is presented to facilitate the use of facet analysis as a bridge between the benefits of the grassroots, bottom-up approach to the selection of tags, and a more controlled and efficient organization and visual browsing of tags in social tagging applications.

*Louise F Spiteri – School of Information Management, Dalhousie University, Halifax, Nova Scotia, Canada*

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Stella Dextre Clarke

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### ISO 25964: a standard in support of KOS interoperability

ISO 25964: *Information and documentation – Thesauri and interoperability with other vocabularies* will be a two-part standard that updates and revises the existing international standards for monolingual and multilingual thesauri. And not just that: it should also help thesauri to play their full part in access to networked resources, particularly in a Semantic Web context. Part 1 (dealing with the development and establishment of thesauri) is on track for publication in 2011, while Part 2 (focusing on interoperability) is scheduled for completion in 2012. A large part of the content is intended to standardize mapping between one vocabulary and another.

*Stella Dextre Clarke – Project Leader, ISO NP 25964*

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Elise Conradi

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### Modelling a folksonomy with the postulational approach to facet analysis

An in-depth study of faceted classification theory, as presented by Ranganathan and further developed by Brian Vickery and the Classification Research Group, led to the creation of a methodology based on the Postulate of Fundamental Categories, the Postulate of Basic Facet and the Postulate of Isolate Facet. This methodology was then used to analyze the facets of a dataset consisting of over 107,000 instances of 1,275 unique tags representing 76 popular non-fiction history books collected from the LibraryThing folksonomy (see <http://www.librarything.com/>).

Preliminary results of the facet analysis show the manually-produced, two-faceted classification models in the dataset, one representing the universe of books, and the other representing the universe of subjects within the universe of books. The model representing the universe of books is considered to be complete, whereas the model representing the

universe of subjects is incomplete. These differences are discussed in the light of theoretical differences between special and universal faceted classifications.

The model representing the universe of books is then compared to other models of books, including the BIBO ontology and the FRBR model. Finally, the models are discussed in terms of their confirmation or violation of Ranganathan's seven Canons of Classification, upon which the postulates are based.

*Elise Conradi – National Library of Norway*

## Session 8

Day Two, 16:00

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Deborah Lee

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## Special subjects: music and mathematics

Chair: David Penfold

### Faceted music: towards a model of music classification

The organization of music is a subject that has fascinated classification researchers and librarians alike for over a hundred years. This paper identifies five key methodological approaches undertaken by commentators on music knowledge organization, which demonstrate different interdependent relationships between musicology and classification.

Five significant themes form the main body of this paper, and these themes underpin the corpus of music classification literature. The first theme concerns the question of whether classification should divide music materials into their constituent formats. This division sets conceptual against practical. The second theme looks at facets in music classification. 'Medium' and 'form' are considered to be the most important facets for music scores; 'composers' are an important facet for music literature. The third theme considers the poor treatment of 'other' musics in knowledge organization, and notes some possible explanations. The fourth theme investigates the relationship between the classification and retrieval of music materials. This section highlights the differing needs of users and suggests how the classification of music materials is adapted accordingly. The fifth theme discusses pre-existing music classification schemes, with the large number of home-grown and special schemes highlighted.

The paper concludes that the five identified themes point towards a model of music classification. However, the model is not just concerned with facets, musics and formats; it is also based upon the relationships between various sets of protagonists, such as the librarian and the musicologist, the musicologist and the performer. Through studying these protagonists, the traditional boundaries of musicology, music librarianship and knowledge organization will be crossed.

*Deborah Lee – Courtauld Institute of Art and City University, London*

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Jean Debaecker  
Widad Mustafa El Hadi

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### Music indexing and retrieval: evaluating the social production of music metadata and its use

This article will focus on music indexing and retrieval from different points of view. Four elements will be examined: music metadata, indexing and retrieval methods (classic indexing, collaborative indexing and social tagging), tools and users. Regarding the users, we will look at their access modes, their possible participation in indexing, and their music information-seeking behaviors. Do they look for music information in pay-for-music sites (iTunes), radio stations, blogs, or social networks (MySpace, YouTube, etc)? The question we raise is which music information systems would be suitable in a social Web era. An evaluation of the existing indexing and retrieval modes was conducted. It was based on both quantitative and qualitative approaches. Our research methodology used interviews, online questionnaires and semi-directed questionnaires. We believe that the results of our evaluation will be useful for music information indexing in a Socio-Semantic Web context.

*Jean Debaecker and Widad Mustafa El Hadi – Laboratoire Geriico, University of Lille 3, France*

## Some facets of knowledge management in mathematics

Knowledge management in mathematics has a long history. The development of *Jahrbuch über die Fortschritte der Mathematik* in 1868 saw the first systematic analysis of the content of a comprehensive set of mathematical publications which would be termed today the core of mathematical knowledge. The leading reviewing services in mathematics – formerly the reviewing journals *Zentralblatt für Mathematik* which followed the *Jahrbuch*, and *Mathematical Reviews*, which are today the databases ZBMATH and MathSciNet – have introduced and popularized several notions and tools for analysing the content of mathematical knowledge, for example a classification system for mathematics (the Mathematical Subject Classification – MSC), keywords for the most relevant terms of a publication, and abstracts and reviews for short descriptions of the content of publications.

In the electronic age, the challenges of knowledge management have dramatically increased. New types of knowledge have been developed (for example, software), information is linked together, and the World Wide Web has become the universal archive – by far the biggest archive ever, and a storage medium for all kinds of information. It is therefore necessary to improve the existing methods and tools for retrieval and knowledge management.

In our contribution, our intentions and ideas for a redesign of the MSC will be presented. The MSC is a complex hierarchical classification scheme for mathematics and areas of application of mathematics. It was developed in the 1970s and is periodically updated by the editorial offices of ZBMATH and MathSciNet in cooperation with the mathematical community. (For more information see the MSC master site at <http://www.msc2010.org>.)

The MSC has some deficits hampering its use: too many classes (more than 5,500) which make it confusing for the user, missing strong definitions of the classes, and as a consequence a broad overlapping and redundancy of the classes (the MSC is only rudimentarily a faceted classification). As a first step we mapped the present version of the MSC into a machine-understandable XML version basing it on the Simple Knowledge Organization System (SKOS) and Resource Description Framework (RDF). The SKOS version will enable automatic processing of the information in the databases mentioned above, for example a cross-linking of the database entries with library catalogues, but it will also offer new retrieval functionalities for the human user.

In a second step, we will enhance the MSC by semantic annotation and redesign of its structure, for example by characterizing the MSC classes with a controlled vocabulary.

In our presentation we will present a first SKOS version of the MSC and discuss its use in the future.

*Patrick Ion – Mathematical Reviews*  
*Wolfram Sperber – FIZ Karlsruhe, Germany*

# Posters

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Vera Regina Casari Boccato  
Mariângela Spotti Lopes Fujita

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## **The use of an indexing language in the catalogues of university libraries: a method for its evaluation by users based on a sociocognitive approach**

The use of an indexing language in the catalogues of university libraries was evaluated from the perspective of the users, using a sociocognitive approach. The methodology consisted of a diagnostic study of the processing and use of indexes of nine libraries of the UNESP Network, specifically those covering civil engineering, education and dentistry, using the Introspective Verbal Protocol technique in both Individual and Group forms. The purpose of the study was to examine the process of bibliographic search as well as views concerning the performance of the indexing languages in dealing with information retrieval. Individuals participating in the Group Verbal Protocols consisted of heads of libraries, cataloguers, reference librarians, faculty staff (teachers) and students. Those participating in the Individual Verbal Protocols consisted of students in their first and last years of the relevant courses.

The study reported on statements issued by the 63 participating individuals who obtained unsatisfactory results using the Subject Headings List of the BIBLIODATA Network, this being the indexing language used by the Brazilian UNESP Libraries Network in retrieving information from the ATHENA Catalogue. Problems were reported with the following aspects of the language: a lack of specialized vocabulary and updating, inconsistencies in the syntactic-semantic structure of headings, and ambiguous headings. The evaluation shows that to enable effective information retrieval in a specialized scientific area, an indexing language needs updating, appropriate specificity and consistency.

*Vera Regina Casari Boccato – Universidade Federal de São Carlos, Brazil  
Mariângela Spotti Lopes Fujita – Universidade Estadual Paulista, Brazil*

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Ricardo Eito-Brun

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## **Integration of SKOS and SRU in a distributed collaboration environment for archival material description**

This poster describes the implementation of a solution based on the technical protocol SRU (Search/Retrieve URL) to search controlled vocabularies codified in SKOS. The application has been developed to access the engineering thesauri published by the Spanish Ministry of Civil Engineering – Ministerio de Fomento. SRU is a technical protocol designed by the Library of Congress to access remote bibliographic databases; it is the result of an effort to adapt the Z39.50 protocol to the World Wide Web. In this contribution, the author proposes a profile SRU to access remote thesauri from different software applications used to complete and edit metadata. Cataloguers can search these remote thesauri and assign descriptors to the records they create, regardless the metadata schema they are working with (EAD, MODS, MARCXML, etc.).

The proposed technical solution allows centres managing thesauri to expose and share their controlled vocabularies worldwide. This gives more visibility to these controlled vocabularies, and other libraries and archives may access them and benefit from the reuse of already-developed thesauri. The author considers that the capability of reusing these thesauri across a wide community of users is a key factor to demonstrate and justify the cost of the controlled vocabularies' development and maintenance.

*Ricardo Eito-Brun – Universidad Carlos III de Madrid*

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Kristin Johannesson

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## **Intersectional perspectives on collaborative tagging**

In this poster, *intersectionality* is described as a theoretical framework for analyzing collaborative tagging. This is part of a dissertation project in which the author analyzes and compares different collaborative tagging systems, and more traditional knowledge organisation systems (KOS). The objective in the study as a whole is to discuss collaborative tagging as a general phenomenon and empirically, through a study of Delicious compared to two

*Continued over →*

other tagging systems – LibraryThing and Flickr. The poster focuses on the perspective of how and why intersectional theories can be used to analyze collaborative tagging.

Theories on intersectionality problematize identity categories, representation, categorisation, marginalisation and language. One main point in this poster is the overlap between criticism of society from an intersectional viewpoint and criticism raised towards traditional KOS from critical knowledge organisation (KO) research. In collaborative tagging, there are possibilities to use a multitude of intersecting categories instead of mutually exclusive ones. There are also other aspects that are interesting to relate to intersectionality. New types of marginalisation, such as a domination of majority viewpoints and stereotypes can be found. Objectivity and neutrality, which more traditional KOS have as ideals, are even harder to demand from these systems and their users.

In earlier research on tagging, a wide range of both new and more tested methods and perspectives are prevalent. Different methodologies and perspectives can capture different and significant aspects of collaborative tagging. Perspectives used in analyzing tagging are of interest and importance to discuss, as it is a new and emergent field.

*Kristin Johannesson – University of Uppsala, Sweden*

## **A user-centred approach towards a semantic multimedia information system**

The aim of a multimedia information retrieval system is to provide answers that correspond most closely to the users' information needs. Generally in information systems (IS), users express their information needs in the form of queries, and the system matches the formulated queries to the database to find relevant information. In the case of multimedia information, the needs of users can be related to the document in its totality or to its sub-sets, for example the sequences, the scenes, the passages, the dialogues, etc. In multimedia information systems we try to help the user to access the specific bits of information he is looking for, and to adapt the answers from the system to meet his diverse information needs. The questions which can be asked, and to which we try to provide answers through the semantic approach, could be the following:

- How can we allow the user to gain access to the relevant multimedia information easily?
- What knowledge and which metadata should be integrated in the multimedia information system for semantic research?

The main idea that drives our approach is to provide a semantic and dynamic multimedia information system centred on user information needs and the semantic aspects of the multimedia documents. It will thus be interesting to model the user at the same level as the document in order to better satisfy his information needs in terms of time spent and relevance of the results. We will also focus on the notion of semantic subjectivity in multimedia document indexing and representation.

Our proposal of a semantic and dynamic information retrieval system seeks to improve the classical approaches of multimedia representation by extending the use of metadata proposed by these approaches. We assume that the use of a Context-Ontology alleviates the problems of user information needs in the information retrieval process. In order to ensure adequate responses to these needs, we can assist the user in his process of information retrieval by determining the appropriate use of the Context-Ontology. Indeed, we propose to guide the user in choosing from the visual Context-Ontology, which contains relations between different types of multimedia content (image, sound, text, etc) and the context declared by the user. The representation and the indexing of multimedia information are enriched with RDF-formed metadata according to the Linked Data guidelines. While the system we are implementing has not yet been tested in a real information retrieval situation, the initial findings indicate that this approach could provide a semantic-dynamic solution in terms of metadata expressivity, interoperability and data sharing.

*Hanene Maghrebi – Université Nancy, France*

## **Knowledge and its organization as multiple facets, forms and functions; an example of cultural-historical landscapes**

Knowledge Organization (KO) and Conceptual Modeling (CM) are both forms of knowledge structuring about reality domains. KO is foremost a post-structuring activity as it is applied to knowledge from others in order to search and find it afterwards. CM is primarily concerned with the development of information systems meant for the recording of knowledge as well. These systems contain principally structured and coded data and hence CM implies a pre-structuring of knowledge.

Both KO and CM start from conceptualization. They also apply similar knowledge structures (or Knowledge Organization Systems – KOSS) such as categorizations, classifications, thesauri, gazetteers, and ontologies, based on aspects (or ‘facets’) and their relations. KO’s and CM’s starting points, approaches and views on reality domains, though, are somewhat different. KO can be seen as being characterized by three S-principles (Sciences-based, Scientific, Systematic approach), CM by three P-principles (Praxis-based/Pragmatic, Perception, Process information included).

A first question in this contribution is how the KO and CM approaches can help each other. A second question is where KO and CM meet in practice. The third question applies to the reality domain of cultural-historical landscapes and heritage. It appears, from a CM point of view, that it is approached quite differently – at least in the Netherlands – from e.g. business domains. The result is a ‘fragmented domain’ with many views and conceptualizations. Applying the principles of both KO and CM leads to some combined recommendations for this domain in the future.

*J. Sophie Visser – Utrecht University, Netherlands*

## **When librarians become researchers: the creation of international culture of knowledge sharing beyond the borders**

Knowledge sharing is one of the most important factors in science. Thanks to the Internet and open science, knowledge is not locked away and the ways of sharing knowledge have increased. A cursory review of literature showed that there are only a few studies describing knowledge sharing (KS) among students, and no study on knowledge sharing among library and information science (LIS) students coming from different disciplines and culture. This study is the first attempt to describe KS among LIS students.

The objectives of the study were to investigate the purpose, types, preferred communication channels, motivation, and barriers of knowledge sharing among GERiiCO students. A cross-sectional survey research design was employed. The data was collected through a Web survey of 136 Masters and PhD students. The findings of this study showed that generally the students were willing to collaborate and share their knowledge. The preferred communication channels used for KS were face-to-face, email and Web 2.0 tools; the preferred sources were internet, university library, meetings, seminars, conferences and workshops. Those with an academic or informational purpose were the most important. The main barriers found in KS were the lack of time, the lack of awareness of truthfulness, and the lack of recognition, encouragement and reward. The respondents’ suggestions were to develop KS through formal association, students’ networks, forums, or oral knowledge sharing.

*Zuzanna Wiorogórska – University of Warsaw Library, Poland*

*Shafiq Ur Rehman – Research Team GERiiCO, University of Lille 3, France*

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