

Trends & Issues in Library Technology

IFLA IT Section Newsletter

July 2017

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From the Section Chair

“ Change is the new norm for technology in libraries especially with the pace of consumer electronics and technology developments.

Technology underpins library operations from ordering and purchasing of materials to providing in-building and online services. It is a foundational tool to enable and facilitate better workflows, productivity and creativity. Many of us have seen the evolution from the catalog card to online integrated library systems and continuing today with search engine optimization, artificial intelligence and machine and deep learning developments.

Change is the new norm for technology in libraries especially with the pace of consumer electronics and technology developments. Our users often have 2-3 mobile and/or wearable devices with Bluetooth and WiFi enabled, and the presence and use of consumer electronics in the library will only continue to grow.

In the spirit of open access and empowering our users, libraries provide print and digital resources, computers, learning spaces and facilities, and audio-visual and media equipment. More importantly, our librarians and staff are at the front line to welcome, help, and teach our users.

Technological trends will continue to impact all libraries and present us with challenges but even more opportunities for the development of new and innovative applications and services for users. This is a leading topic at IFLA Global Vision discussions and continues to be reflected in the IT Section's active engagement and participation in joint satellite conferences and main conference sessions at WLIC 2017.

I encourage everyone to participate in the IFLA Global Vision discussions and look forward to meeting all who can attend WLIC 2017. ■■

May Chang
IFLA IT Section Chair



Welcome to first 2017 issue of TILT! We have articles on the use of technologies in various libraries from analytics, data, end user application, etc., and a report on the International News Conference held at Iceland on 28-29 April 2017.

With the increasing adoption and use of Internet of Things (IoT) in people's daily life, libraries need to rethink the use of technologies in improving library services from being checking out of books using RFID or scanning of a QR code.

IFLA WLIC 2017 is around the corner, and the list of IT Section events and activities is included here. Please feel free to contact any of your Section officers for more information, and to join us at the IT Section meetings.

I want to thank our contributors for sharing their news, and encourage all members (and non-members) to submit articles.

Happy reading!

Joan Wee
Information Coordinator / Editor

IFLA WLIC 2017 IT Section Events and Activities

A consolidated list of events and sessions associated with IT Section.

IT Section Standing Committee Meeting I – Business Meeting
Sat 19 Aug 08:00-10:00

IT Section Standing Committee Meeting II – Business Meeting
Thu 24 Aug 13:30-16:00



SATELLITE MEETINGS

Wed 16 - Thu 17 Aug

Innovation and the User Experience: Evaluating and Implementing Discovery Systems

Reference and Information Services Section and IT Section
University of Warsaw Library, Warsaw (Poland)

Data Curator's Roles and Responsibilities: International and Interdisciplinary Perspectives

Library Theory and Research Section, Preservation and Conservation Section, and IT Section
Warsaw University, Faculty of Journalism, Information and Book Studies, Warsaw (Poland)

The Challenge of Multiple Identities. Multi-ethnicity in Genealogy, Local History and Regional Memory – Challenges and Opportunities for Libraries and Other Memory Institutions

Genealogy and Local History Section, Asia and Oceania Section, and IT Section
Martynas Mažvydas National Library of Lithuania, Vilnius (Lithuania)

MAIN CONFERENCE SESSIONS

Sun 20 – Wed 23 Aug

The Use of IFLA Standards in the Linked Data Environment: Strategies, Applications and Success Stories

Committee on Standards
Sun 20 Aug 13:45-15:45

New insights at the intersection of genealogy and other professional communities intersection of genealogy and other professional communities - including librarians, archivists, historians, demographers, linguists and anthropologists

Genealogy and Local History Section, Asia Oceania IT Section
Mon 21 Aug 10:00-13:00 Lower Silesian Public Library, Wrocław

Women, Open Technology & Culture

Women, Information and Libraries SIG and IT Section
Mon 21 Aug 16:00-18:00

Linked Data - Open Discussion Session

Linked Data SIG
Wed 23 Aug 09:30-12:45

A memory bank for the digital society: national libraries and web archiving

National Libraries Section and IT Section
Wed 23 Aug 09:30-12:45

Text and Data Mining (TDM) Workshop for Data Discovery and Analytics

Big Data SIG
Wed 23 Aug 11:45-13:30

Disruptions in library services: addressing challenges, finding solutions

Division III Library Services and New Professional SIG
Wed 23 Aug 13:45-15:45

Report on 2017 IFLA International News Conference

27-28 April 2017,
Reykjavík, Iceland

Edmund Balnaves, Director, Prosentient Systems, Australia
< ebalnaves@prosentient.com.au >



This 2-day conference was jointly sponsored by the News Media and the Information Technology sections of the International Federation of Library Associations and hosted by the National and University Library of Iceland.

The conference touches key areas in news, media and information technology like discourse around new developments in media, dramatic changes in news and media environment wrought by technology and social media, and developments in innovations that deliver these rich and accessible online media resources.

The first day of the conference focused on the library challenges and experience in building online archives of historical news media resources, with valuable case studies from video and newspaper archives in Iceland, the UAE, the US, Denmark and Germany. The day session also had speakers sharing diverse and interesting ways in which these online resources create opportunities for public engagement in genealogical, historical and current media research and production, which in turn shapes the changes in present journalism.

The second day session covered topics like use of technologies in digital collection development, data sharing using linked data, open data, developments in open access and sharing of open source solutions. Technology had greatly changed the landscape of publishing in the news and media arena. Decline in print media production and explosive growth of alternative media outlets poses many challenges for libraries and cultural institutions. The unparalleled innovations in the digital library and information technology space are matched by equally large challenges in the representation, curation and cultural preservation of news media in the diversity of new publishing environments.

Conference program : <https://ifla2017.landsbokasafn.is/> ■■

Analytics of Library Space

Aaron Tay

Manager, Library Analytics & Research Librarian, Singapore Management University, Singapore
< aarontay@smu.edu.sg >

Like many academic libraries, the Singapore Management University (SMU) Libraries views the use of space as a matter of great strategic consideration. This makes studying the analytics of space an important task.

So how do we measure use of space?

As students enter the Li Ka Shing library, data is captured as they tap their cards against the turnstile reader. Similarly RFID gates register entry by the student.



While these systems are very useful for measuring traffic flow in and out of the library, it's not necessarily easy to relate this to the number of people in the library at a certain point in time. For instance how many people are in the library on a typical Sunday at 8pm?

They also can't give us more granular statistics such as which areas in the library are more popular. For example, what is the typical occupancy rates of the Lounge area on Level 2?

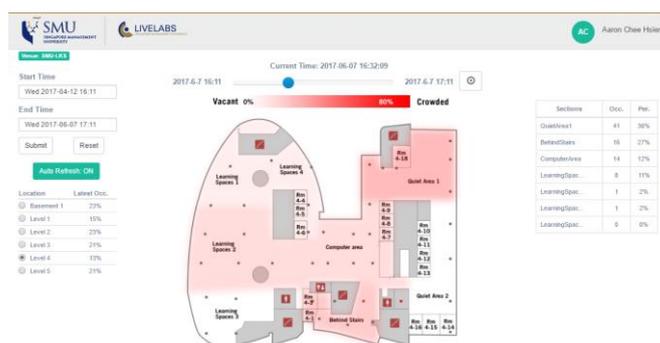
As such, our collaboration with the SMU Livelabs (<https://livelabs.smu.edu.sg/>) a research institution at our University proved to be very helpful, when they offered to setup a system that tracked usage of spaces on their location tracking platform.

As stated on their website "This engine implements special code to continually retrieve wireless signal measurements captured by the Wi-Fi infrastructure (consisting of Wi-Fi APs and

controllers), and then applies advanced and proprietary statistical techniques to simultaneously infer the location of hundreds-to-thousands of devices."

(<https://livelabs.smu.edu.sg/about-us/features-specifications>)

In practical terms, this system together with information on the seating capacity of different areas in the library, allows us to have a near-real-time view of the occupancy rates of each area.



Another interesting facet of the location tracking system is that it allows us to study "dwell times", a measure of how long people stay in different sections of the library.

For privacy reasons, this tracking system does not correlate to identify individual users but it is able to generate graphs on frequency of visits by users.

The nice thing about this system is that it is deployed not just in the library but campus wide. This allows a uniform tracking platform for comparison purposes. Another advantage of deploying this system campus wide, is it is possible to track "transitions".

For example, what is the flow of users from other parts of the campus to the Li Ka Shing Library like on Sunday in the hours when the library has just opened its doors?

The main catch with this system is that it measures devices rather than actual people, so some adjustments to the figures are needed. By using various techniques such as observation and correlation with other sources of location data already mentioned, we obtain a fairly reliable figure sufficient for assessment and decision making.

Venue: SMU-LKS

Start Date

Wed 2017-02-01

End Date

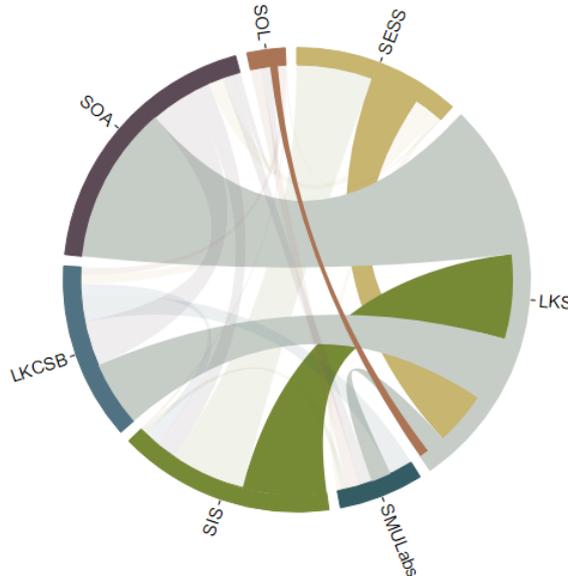
Tue 2017-06-06

WEEKDAYS WEEKENDS

Reset Chart/Hours

SELECT HOURS

- 0:00-1:00 1:00-2:00
- 2:00-3:00 3:00-4:00
- 4:00-5:00 5:00-6:00
- 6:00-7:00 7:00-8:00
- 8:00-9:00 9:00-10:00
- 10:00-11:00 11:00-12:00
- 12:00-13:00 13:00-14:00
- 14:00-15:00 15:00-16:00
- 16:00-17:00 17:00-18:00
- 18:00-19:00 19:00-20:00
- 20:00-21:00 21:00-22:00
- 22:00-23:00 23:00-00:00

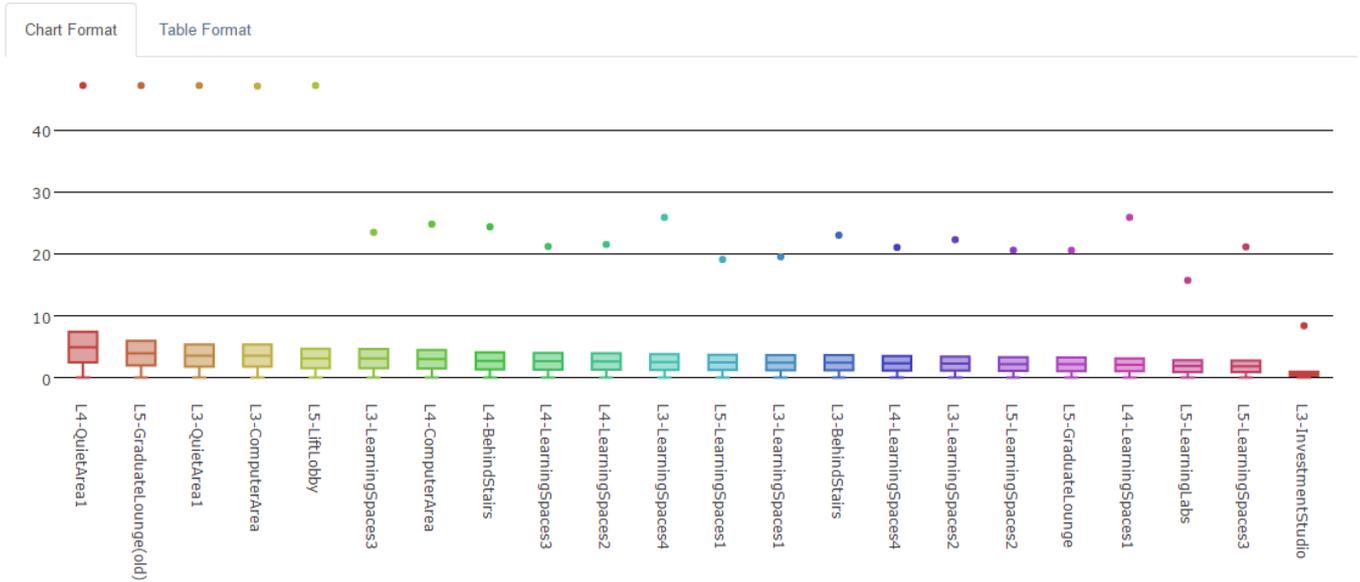


Selected Building: LKS

From->To	Count	Abs%	Cum%
SOA->LKS	16323	21%	21%
LKS->SOA	14688	19%	40%
LKS->SIS	8705	11%	51%
SIS->LKS	8574	11%	62%
LKCSB->LKS	6748	9%	71%
LKS->LKCSB	6549	8%	79%
LKS->SESS	5505	7%	86%
SESS->LKS	5121	7%	93%
SMULabs->LKS	2042	3%	96%
LKS->SMULabs	1947	2%	98%
LKS->SOL	976	1%	99%
SOL->LKS	776	1%	100%
Total	77952	100%	-

Still the system has provided an additional dimension to our space analytics beyond purely counting the number of people entering the library, though we do use this for decisions on opening and closing hours as well.

Duration Chart - SMU-LKS ([Download CSV](#))



Duration Chart - SMU-LKS - Section(s) ([Download CSV](#))

For example, by studying dwell times & early bird user patterns we are able to verify qualitative findings that many students prefer to study for long periods in areas with low foot traffic. We are also able to get a feel of occupancy rates of different sections of the library, which have different furniture and lighting without staff doing manual counts hourly. This has proven to be very helpful for planning for space utilization, e.g. recently planned renovation works take into account the preference for cosy quiet corner areas.

Most importantly, our users benefit from the fact that they can now [see for themselves how occupied the library \(and other buildings in SMU are\)](#) and this helps them make informed decisions on their own. ■■

New Roles for Libraries in Data Management

Wolfram Horstmann

Head, Director State and University Library Goettingen, Germany

< horstmann@sub.uni-goettingen.de >

Jan Brase

Head of Research and Development Department, State and University Library Goettingen, Germany

< brase@sub.uni-goettingen.de >

THE FOLLOWING TEXT IS AN ADAPTATION OF THE FULL ARTICLE:

Horstmann, W., & Brase, J. (2016). Libraries and Data – Paradigm Shifts and Challenges. *Bibliothek Forschung und Praxis*, 40(2). doi:10.1515/bfp-2016-0034

Data Libraries

The concept of a “Library” has changed dramatically through the last years. Libraries for centuries were a major, if not the main research infrastructure for academic institutions. The digital age amplified the role of libraries as multi-data institutions, specifically in academic libraries. Information nowadays is more than articles or books or any kind of mostly textual information.

Why do libraries not already keep a systematic record of research data? Obviously part of the answer lies in the complexity and high context-specificity of research data. The context of data is characterized by the subject of research – the discipline – the phase of the individual research process – from data generation to data publishing and re-use – the funding, privacy and copyright regime and many other ‘soft’ characteristics, among them the temper and ideology of the researchers involved. In a research cycle, the researcher creates various versions of data sets, which often are recorded in the same database or repository. The data set is therefore a composite object. The identifying descriptors of that object must include enough specificity about its constituent parts so that a scholar can refer to one and only one, unambiguous, clearly defined data set. This requires versioning of records and identification of entities that have contributed to or changed them, such as original data author and interpreted data author. However, this is not simply a problem of assigning identifiers or metadata. For the purposes of aggregation, computation, verification, reproducibility, and replicability, the data set must be defined so that it can be referenced in a way that yields a concrete search result [Wyn]. This complexity is one of the reasons why libraries do not keep a systematic of research data.

“Data Libraries” is a rather new term and has not yet been specified properly.

Following the distinction introduced above, there are of course also two classes of data libraries:

- On the one hand data library is referring to library organisations, specifically academic libraries. In this sense, the data library is like a ‘data powerhouse’, i.e. the library as a business data organisation and a content-intensive organisation.
- The second class of a data library, i.e. the abstract, refers to collections of data that apply principles for the organisation of knowledge.

The term “Research data library” has two general meanings. It is too early to decide at this stage of the emergence of data libraries about wrong or right, better or worse. But it is important to consider the spectrum:

Data libraries emerging from the traditional physical world might have high competences in running business for knowledge organisation for 100s of years but might not have the skills to understand the complex nature of research data. Conversely, Data libraries emerging from the virtual world might be agile and adaptive to researchers’ needs but might have no idea how to run a sustainable organisation for more than 10 or 20 years. The growing need for the establishment of some form of data libraries however is compelling.

Knowledge, as published through academic literature, often is the last step in a process originating from research data. These data are analysed, synthesised, interpreted, and the outcome of this process is generally published in its result as a scholarly article.

Only a very small proportion of the original data are published in conventional academic journals. Existing policies on data archiving notwithstanding, in today’s practice data are primarily stored in private files, not in secure institutional repositories, and effectively are lost [Law].

This lack of access to research data is an obstacle to international research. It causes unnecessary duplication of research efforts, and the verification of results becomes difficult, if not impossible [DIT]. Large amounts of research funds are spent every year to re-create already existing data [ARZ]. Progress in sharing of research data has been made at a fast pace. Infrastructures such as grid exist for storage. Methodologies have been established by data curation specialists to build high quality collections of datasets. These include standards for metadata (provenance, copyright, author of a dataset), registration, cataloguing, archiving and preservation. A large number of disciplines benefit from these methodologies and high quality datasets.

Libraries as information hubs

The development of the internet in the last decades and the principle of linking content independently from its physical location dramatically changed the definition of a library catalogue. Traditionally a library catalogue has been seen as a window to the library's holdings, a structured summary of what can be brought easily to the shelf. Due to the growth of the internet in the last decades, this has slowly changed and more and more catalogues offer direct access to pdf-versions of documents, but the principle has been the same throughout the centuries.

Now it becomes more and more impossible for a library to actively store all these kinds of information that are important for its user. Nevertheless the great chance with the growth of the internet is that the library does not have to store this information, when it is available somewhere else in the internet. The libraries job in the future is to know where the information is, if the content provider is trustworthy and to have a distinguished description of the content in its catalogue to offer the service of answering queries from user. In a nutshell, the library of the future should be able to answer the query of a user with the statement:

"We do not have what you are looking for, but we now where it is, and we can offer you a link to it"

This implies many aspects: The library has to be able to understand what the user is looking for. It has to have enough distinguished information about content in its catalogue to know what ideal results would be for the query. In addition, the library has to know where this content is stored and provide a persistent link to it.

Library catalogues are classical sources for information [ING]. As explained earlier, when querying for a certain topic, users' interests might not be limited to only retrieving relevant publications in their results, but also related

datasets collected by the corresponding scholar.

The road ahead

As the world changes, libraries have to change too. Whereas, the physical concept of a library might evolve to a central learning and gathering place on campus, the functional concept of the library becomes more crucial than ever. Libraries have a thousand year old tradition of being gatekeepers and path finders for scholarly information. Academic libraries can continue to play a fundamental role as trusted advisors in this age of "information overload" where academic resources includes more and more heterogeneous content types and new definitions of publishing.

This will be a challenging task, but history has shown that libraries have always been able to adapt to these paradigm shifts. The new natures of tasks and content types require new services and new tools. Throughout the world, libraries and library driven communities like IFLA have shown that the development and maintaining of such tools are classical tasks for libraries.

References

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[DIT] - Dittert, N., Diepenbroek, M. & Grobe, H. (2001) Scientific data must be made available to all. *Nature* 414 (6862), 393. doi:10.1038/35106716.

[ING] - Inger, S. Gardner, T., 2008, How Readers Navigate to Scholarly Content, available at http://www.marywaltham.com/howreadersnavigatetoscholarlycontent_oCT_08.pdf

[LAW] - Lawrence, S et al (2001) Persistence of Web References in Scientific Research. *IEEE Computer* 34 (2), 26-31. <http://www.fravia.com/library/persistence-computer01.pdf>

[WYN] - Wynholds, L. (2011) Linking to scientific data: Identity problems of unruly and poorly bounded objects. *International Journal of Digital Curation*, 6, 215. doi:10.2218/ijdc.v6i1.18



Tooling up to Support Digital Scholarship at NTU Library

Yew Boon Chia

Deputy Director, Head of Knowledge Division, Office of Information, Knowledge and Library Services, Nanyang Technological University, Singapore

< ybchia@ntu.edu.sg >

Over the last few years, there has been a tremendous explosion of interest in big data and real time analytics in Singapore, driven by the government's push towards a Smart Nation and increased openness in releasing data to the public. Some key government initiatives include S\$120 million investment in building Infocomm Technology (ICT) manpower to meet the projected need for 30,000 new ICT professionals by the year 2020, setting up TechSkills Accelerator - a new skills development and job placement hub for the ICT sector, and launching a one-stop portal to share datasets from 70 public agencies and explain social trends and government policies using data analysis and visualisations.

"I believe data is the new currency," said Dr. Vivian Balakrishnan, Singapore Minister for Foreign Affairs and Minister-in-charge of the Smart Nation programme during the launch of the Big Analytics Skills Enablement (BASE) initiative last year.

"If you think about Singapore, what comes to mind? Many people think of Singapore as a strategic port, as a hub that for many centuries connected the flow of trade. If you fast forward another 10 or 20 years, what do you think will be traded, distributed, and produce. I think you will see another revolution, we will be trading bits and design."

Therefore, it is not surprising that local universities are actively engaged in such research. For instance, Singapore Management University has set up the Living Analytics Research Centre, in partnership with Carnegie Mellon University, to work on consumer and social analytics projects. Meanwhile, [Nanyang Technological University](http://www.ntu.edu.sg) (NTU) invests S\$8 million in a new research centre this year – the Data Science & Artificial Intelligence Research Centre, and partners MNCs such as PayPal to improve fraud detection techniques and develop new technologies.

In NTU, the increased demand for digital scholarship (DS) services is driven by the strong focus on open access and research integrity and launch of the [blogs@NTU](http://blogs@ntu.edu.sg) initiative. Arising from the university's Open Access mandate, NTU Researchers are required to submit their published scholarly output into the [institutional repository](http://www.institutionalrepository.org) and to prepare a cohesive data management plan for their grant applications.

On the other hand, faculty and students have freely experimented and leveraged on [blogs@NTU](http://blogs@ntu.edu.sg) to create project websites and course / learning blogs. Here, librarians are on hand to provide help in developing attractive and accessible online websites to store, showcase and preserve research works. Over time, librarians have expanded the milieu of digital project services, ranging from metadata creation, long term archiving, website design to publishing open access journal and training faculty and students on the use and integration of digital tools into their work. Since the acquisition of data skills pave the way for becoming a Smart Nation, it is envisaged that NTU Library will invest more effort in training users.

Another impetus for tooling up to support digital scholarship is the change in library leadership. Since its inception, NTU Library has always been headed by the University Librarian. Last October, a strategic change placed NTU Library under the charge of a faculty for the first time. Professor Schubert Foo, the Deputy Associate Provost (Office of Information and Knowledge), led library staff to evaluate the organisational culture and conduct an analysis on the drivers of change. One outcome of this exercise is to put stronger emphasis on creating value for users in data management and digital scholarship services.

A review of the literature is very instructive and provides useful inputs for developing and scaling up the current digital project services. In particular, the survey of Association of Research (ARL) libraries (SPEC Kit 350) and "An Assessment of Readiness for Supporting Digital Humanities in Hong Kong Academic Libraries" revealed that staffing and funding methods for different academic libraries can vary considerably. Taken together, these articles identify two key challenges in providing digital scholarship services, namely (1) availability of expertise and (2) sources of funding.

Model A: Creating a new and independent department to offer DS services

Variously known as a Centre for Digital Scholarship, Digital Scholarship Lab or Scholarly Commons, it usually staffed by a team comprising of specialists (such as librarians, GIS experts and programmers) and faculty. This arrangement draws on the combined expertise of specialists and faculty and

has the greatest pool of capabilities and autonomy to offer a large range of services listed in Sula's cultural informatics model for digital humanities and libraries. However, this approach requires considerable resource outlay and new headcounts. For instance, the Scholars' Lab set up by University of Virginia has a sizeable team of 3D visualization specialist, design architect, digital humanities developer, project management specialist and an academic director providing expert consultation, teaching and graduate fellowships on digital humanities.

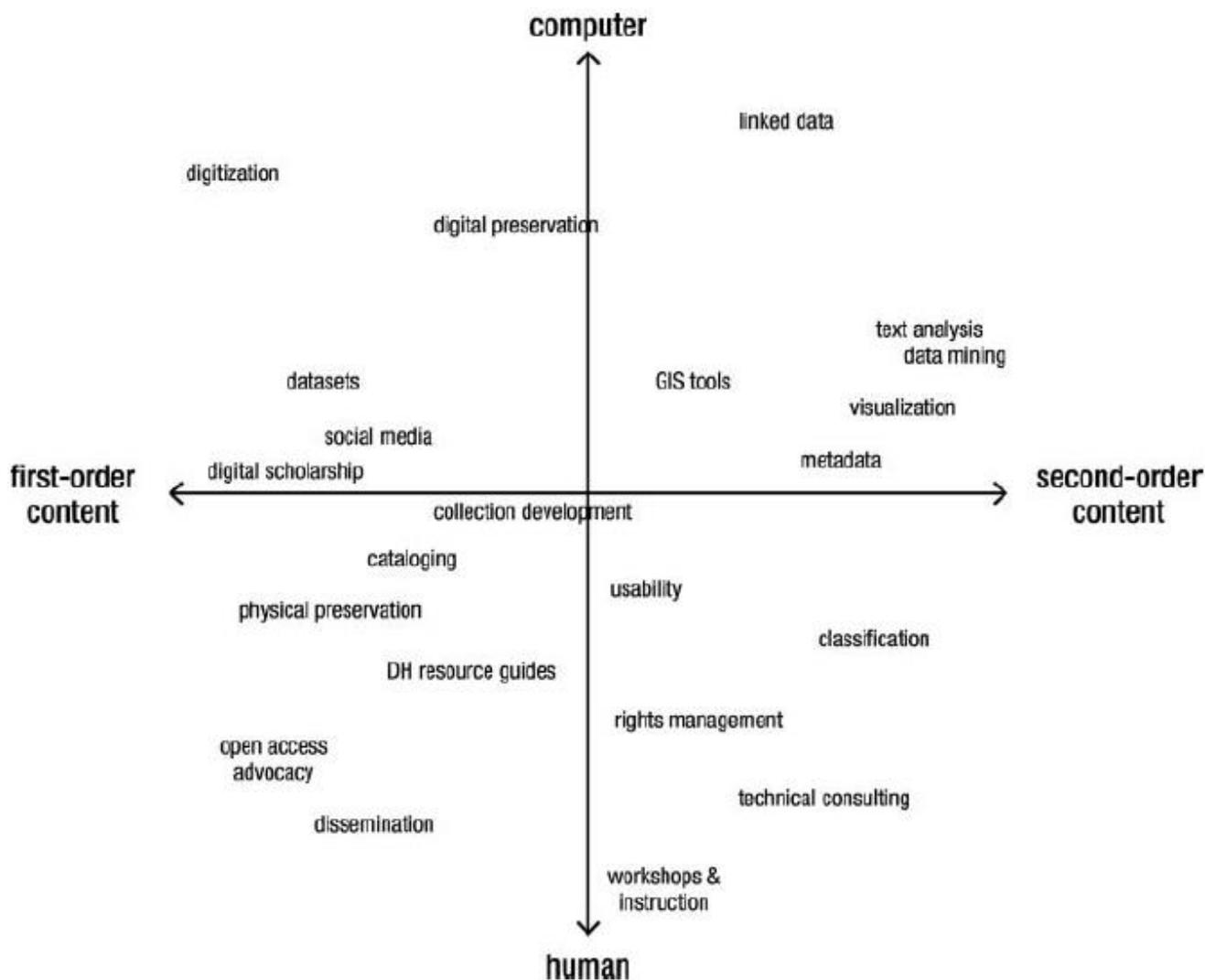


Fig. 1: A Cultural Informatics Model for Digital Humanities and Libraries

Model B: Establishing a small core unit within the library to play a leadership role in DS and drawing support from other library units

One such example is the Center for Digital Scholarship which is a cross-departmental group in the Brown University Library. This is the approach chosen by NTU Library. Instead of requesting for more staff and budget at the onset, this model takes the more measured approach of reallocating existing staff and budget to support digital scholarship services. Coupled with the compulsory job rotation taking place every 3 to 6 years, it ensures that every NTU Library staff will be exposed to digital scholarship activities, making it an all-of-organisation effort and foster a more collegial culture of sharing and collaboration among different library units.

However, this approach has its drawbacks. As this model relies heavily on cross-unit collaborations and each unit has different sets of KPIs and priorities, the level of support offered may not as strong or as prompt when compared to Model A. The types of support offered would be more limited as library staff may not have the necessary expertise. The survey of ARL libraries illustrated this point clearly with libraries providing more frequent support in the traditional areas of library work.

More frequent areas of support for Digital Scholarship

- Digitisation
- Digital preservation
- Making digital collections
- Metadata creation
- Digital exhibits
- Data curation and management
- GIS and digital mapping

Less frequent areas of support for Digital Scholarship

- Developing digital scholarship software
- Statistical analysis/support
- Database development
- 3D modelling and printing
- Encoding content
- Technical upkeep
- Interface design/usability
- Computational text analysis/support
- Visualisation
- Project management

To be effective, it is crucial for the library to adopt a 2-pronged strategy - building up its expertise in digital scholarship and also creating a vibrant community of digital scholarship practitioners. Firstly, NTU Library upskills library staff by sending them for related training and conferences. Secondly, the new Research Commons in the flagship Lee Wee Nam Library is positioned as a space to encourage users to produce something imaginative and to communicate their work. This thereby serves as a locus of expertise in digital scholarship and digital humanities. Computing facilities, infrastructure needs and costs of acquiring digital scholarship tools and platforms are presently catered for by the Research Commons budget. With funding issues addressed, the core DS team can focus creating a conducive "marketplace" where users seeking DS expertise can be easily connected to users offering DS expertise.

Over time, NTU Library aims to progressively expand support for digital scholarship beyond the traditional areas of library work to cover new areas listed in Sula's model. Perhaps more importantly, NTU Library will turn into a more adaptive organisation under the new leadership that could respond to changing user needs as the research landscape continues to evolve.

Notes

An Assessment of Readiness for Supporting Digital Humanities in Hong Kong Academic Libraries
<https://www.igi-global.com/chapter/an-assessment-of-readiness-for-supporting-digital-humanities-in-hong-kong-academic-libraries/132353>

Center for Digital Scholarship (Brown University)
<http://library.brown.edu/cds/>

Digital Humanities and Libraries: A Conceptual Model
<http://dx.doi.org/10.1080/01930826.2013.756680>

Scholars' Lab (University of Virginia)
<http://scholarslab.org/research/>

SPEC Kit 350 <http://publications.arl.org/Supporting-Digital-Scholarship-SPEC-Kit-350/>



Create your Library's own Online Database App

Perseus Rex Molina

Head, Technical Services, Br. Fidelis Leddy Learning Resource Center (LRC), De La Salle-College of Saint Benilde, School of Design and Arts (SDA) Campus, Philippines
<perseusrex.molina@benilde.edu.ph >

There could be times when a library might want a customized online database application for ease of adding functionalities to better serve clients and be more efficient. The database might be used to capture data and requests that their integrated library system cannot record, like room bookings, AV equipment scheduling, retrieve details of nearby libraries for referrals, or to direct connect online forms to a database to achieve real-time collaboration on data edits and auto-notifications for request status. Creating an online app allows the flexibility of accessing the database anywhere, which is ideal for team collaboration, especially if the team members are in different library branches.

The screenshot shows a search results page for a database of libraries. At the top, there is a search bar with the text 'de la salle' and a search button. Below the search bar, there is a table with columns: Name of Institution, Name of Library, Abbrev. Name, In-Charge, Designation, Address, and Actions. The table contains several rows of library information. A red box highlights the search bar and the search button, with the text 'Instant search' and 'Search from DB'. Another red box highlights the 'Name of Institution' column header, with the text 'click any column headers to sort by associated attribute values'. Below the table, there is a link that says 'Select a row to view Library details here.'

Name of Institution	Name of Library	Abbrev. Name	In-Charge	Designation	Address	Actions
De La Salle Araneta University	University Library		Priscilla M. Alba	Chief Librarian	Salvador Araneta Campus, Victoria Ave., Malabon City	
De La Salle Health Sciences Institute	Romeo P. Adiego, MD Library Services Center	DLSHS		Services	Angelo King Medical Research Center Bldg, Dasmarinas, Cavite, Philippines 4114	
De La Salle Caintang Library	De La Salle Caintang Library	DLSJC	Jane L. Sabong	Director of Libraries	Leandro Y. Locsin Campus, Legaspi Boulevard, 151 Stone Road, Barangays Bifa and Matang, Bifan, Laguna	
De La Salle Lipa	College Learning Resource Center		Lilian C. Rabin, Maria Chona M. Chavez	Head Librarian, Readers Services Librarian		
De La Salle Dasmarias	Alibang Emilio Aguinaldo Alibang Service Hours		Sonia M. Gementiza	Director	Dasmarias, Cavite	

Fig. 1: A sample search results display for a database of libraries. The database is used as a reference tool in advising users who wish to visit other libraries and for composing referral letters.

In order to create customized database applications to support library processes, the ideal scenario is for a library to have its own in-house IT staff to develop the program, but as is the case with most academic libraries, it will rely on its institution's IT department for this requirement. Joint projects with the IT department, (or even with students and faculty of the computer science department, if existing in the institution), can be very successful, but their success depends on a number of factors. The usual roadblock is that the IT department that serve the whole university may also be short on staff, and if there is no one assigned to focus on developing software for the library, the project can take months or years to complete (if it does take off at all). If such is the case, then even after it is finished, modifications on the library app can also take some time, so a library cannot be as responsive as it would like to be when its data requirements change.

A related maintenance issue that does not often

get talked about in joint projects is the service continuity. We may have heard of a project that stagnated when the developer who is a student or a faculty member or an employee either graduated or resigned from the institution. Even if the developer left very detailed documentation on the project, it is not guaranteed that there will be a qualified person in the department to continue it, so oftentimes the project dies and the library has no choice but to start from scratch.

The rise of cloud computing has brought along with it an alternative solution for libraries to easily create robust applications, without the need to have staff members who know how to code. They can take advantage of cloud-based database creators.

Cloud computing is defined as "the use of computing resources (software and hardware) that are shared as services over a network (typically the Internet)" (Khalid & Shahbaz, 2013, p.348). Any network where the services are shared is called "the cloud", which, for web-based services, is synonymous to the Internet. There are three delivery models in cloud computing: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS).

IaaS is the delivery model where the vendors provide "servers (such as processing capability), storage (such as replication, backup, and archiving), and connectivity domains (such as firewalls and load balancing), with the client organization charged based on their use" (Garrison, Kim, & Wakefield, 2012, p. 63).

If the client organization does not need to custom-build an infrastructure and just wants access to a ready-to-use application-hosting environment, there is PaaS. One of the most popular example of PaaS is the Google App Engine, where you can build applications in Node.js, Java, Ruby, C#, Go, Python, or PHP language. As part of the Google Cloud Platform, App Engine is also flexible enough to function as an IaaS if the organization has specific CPU and memory requirements.

The last delivery model is SaaS, "in which software and data are hosted centrally in the cloud — in other words, virtually — and are accessed by clients using a Web browser" (Robinson, 2011, p.71). Nowadays, SaaS enables people to do most

of their computing with just their browser, without the use of any other software installed in their computers. With popular services like Youtube and Spotify, even consuming media and entertainment no longer needs a separate media player, or video or music files present in the computer's hard drive. In fact, a lot of the common web-based services that we already use are examples of SaaS. Examples like webmail clients like Gmail or Hotmail, and web-based office productivity suites like Google Apps and Microsoft's Office Online. Examples of SaaS that cater to libraries are:-

- Springshare web app suites that consists of Libanswers (online reference platform), Libguides (curation and knowledge-sharing platform) and LibCal (bookings and appointment scheduler).
- OCLC has hosted EZproxy (access and authentication software), ContentDM (digital collections management) and WorldCat Discovery (discovery service). Even a complete library management system, like OCLC's WorldShare and Proquest's Intota, can now be cloud-based.

Another use of SaaS is as a no-code app development platform or database builder, which can enable a user of any skill level to create their own database apps. This usually works by letting a user define his data, relate it with his other data, and set up workflows, all using an easy-to-use interface commonly consisting of webforms with drag and drop capabilities, without the need of programming knowledge. Examples of such are [Zoho Creator](#), [Knack](#), [Caspio](#) and [QuickBase](#).

If you have a library with small-scale requirements, this type of SaaS could be an alternative solution that has many benefits, as enumerated below:

1. It is faster to implement in comparison to a web-based application that requires resources and time to install on a server, which in turn incur costs to procure and maintain. SaaS provides a user the ability to create an online app from out of the box solution and can be accessed 24/7 by an Internet browser. There is no need to wait for both the procurement and configuration of a server, and the installation of licensed software on server and client machines. The user just need an account and can instantly design and deploy his creation.
2. It resolves some service continuity issues. An ideal vendor that offers a no-code app development platform tends to have exhaustive documentation on how to use it, along with responsive technical support. Apart from this, it allows people who isn't proficient in database programming but with basic database design know-how to create and

deploy apps using it. Because of the ease of use, any library staff can learn to design using the service and update the library app should data requirements change. This makes the library less dependent on more technically skilled people.

3. It is usually cheaper and scalable. Aside from the savings the library enjoy from not needing to procure extra hardware and its accompanying maintenance for the cloud-based app, it also saves on costs and manpower relating to software maintenance, as the SaaS vendor takes care the updating and manages the upkeep of the platform. Also, many SaaS vendors lets users choose among service tiers, depending on their application needs. These tiers may differ on maximum number of users, records, bandwidth, or presence of additional features like the ability to interact with other services (like email or cloud storage). This "pay-for-only-what-you-need" aspect is important as it means a library can start small and then opt to upgrade anytime to a higher tier after the application is deployed and becomes popular. This reduces the risk of overspending for a project in its development stage. Many services even offer a free fully-functional trial so the library can experience first the development and testing of their application before subscribing to the service.
4. It allows for redundancy. Cloud providers usually store backups of clients' data in several storage servers all over the world. This ensures that the library will be able to retrieve its data even after a local disaster strikes.

The no-code app development platform itself has other advantages. Below are hallmarks of what you should expect in a SaaS database builder:

- Advanced searching, sorting and filtering. A database app should make it easier for users to find the information that they need, especially if they have lots of data. The ability to isolate records with relevant keywords and/or by predefined criteria is one of the most basic things an online database should excel at doing.
- Customized views. Instead of sorting and filtering for required data every time, the interface of the application should be able to offer multiple pre-configured data displays to a user, each possibly maximized for a given task and can be invoked in a single click. The customized views can be shared among team members or each member may have their own views, depending on their role and task.
- Data visualization and reports. The service should be able to automatically generate charts or graphs based on the data it contains. Some services can also do more with select

data types. For example, records with geographical data can be plotted in a map, and dates can be arranged in a calendar or timeline view.

- Batch import. If the library already has existing data, there should be a means to transfer the data in bulk instead of encoding records one by one.
- Batch export. Data within the online database should not be viewable only in the online database. The service should support several ways to export all or selected parts of the library's data if needed so it can be used for reporting or for further manipulation in other software.
- Integrated online forms. The database builder service can enable a library to create patron-facing web-based request forms where submitted data are directly inputted as records to the database.
- Multi-level user roles. The service may support different level of users with distinct authorizations in viewing, editing or creating of data. Users may range between administrators who can create and maintain the database app, editors who could only modify the records, or guest users who can only view but not modify records. Some services even makes it possible to fine-tune what sort of data can be seen by each user.
- Audit of changes. The database app may also track database changes and automatically logs the user responsible for it. A record of what has been changed and by whom is vital to team members of any collaborative software, as it could lessen redundancy of efforts and gives accountability to team contributions.
- Automated email notifications. Many SaaS database builders can also give a library the ability to setup a template acknowledgement email inserted with request details and have it configured to send it to the requestor every time he submits a request through the webform. This feature can also be used to notify requestors of changes every time the record of their request is updated. Not only is it a time saver for library staff who needs to compose emails manually for such events previously, but it also further strengthens the relationship between requestors and the library through instant communication.

Cloud computing, of course, is not without its disadvantages. Obviously it is not a recommended solution if Internet unreliability is an issue in the library. The quality of experience is also very much dependent on the SaaS vendor. As a service, how often do they have service outages? How responsive is their technical support in addressing suggestions and concerns? How often do they update their product to include new features? In

terms of budgeting, the pricing of the yearly subscription of some providers, if added up, may be comparable or even exceeds the cost of developing and maintaining a self-hosted database application at first glance.

But all in all, exploring the capabilities of cloud services to enhance efficiency is a worthwhile effort for a librarian who wants to make the most out of available resources. Not only are SaaS applications faster to deploy, they free libraries resources and time from installation, maintenance and upgrading of hardware with changing requirements. With a reasonable rate, a SaaS can be an affordable solution for many libraries that have a stable and fast internet connection.

This does not, however limits libraries from exploring other available methods of software creation or acquisition in its constant search for digital tools to better its services; to continue fostering worthwhile partnerships with their institution's IT Department; or in creating tie-ups with computer science faculty and students to develop library tools or to improve existing ones.

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“Spaces” web app

Jiixin Low

Research Librarian, Singapore Management University, Singapore

< jxlow@smu.edu.sg >

[Singapore Management University \(SMU\) Libraries](#), comprising the Li Ka Shing Library and Kwa Geok Choo Law Library, hosts many visitors each year, including local and overseas visitors and students.

In SMU, student corps called SMU Ambassadors are the ones who conduct campus tours for SMU visitors, and the library is a short stop on the campus tour. On occasions, library staff would overhear SMU Ambassadors providing incorrect information. Moreover, SMU Ambassadors usually have limited time in the library, managing to highlight one or two areas of the library before they move to the next stop.

Library staff conduct more in-depth library tours for visitors and large group tours for students. In recent years, some of the student groups have even exceeded more than 100 students in size. Crowd control and time and noise management became issues when leading tours for such large groups.

In response to these challenges, the “Spaces” project team created a web app to supplement library tours. The app is essentially a photo gallery with images and short captions. We based the concept on exhibition catalogues; it would complement physical visits, provide a memento of the visit that visitors can take away, and be a virtual tour for those unable to visit in person.

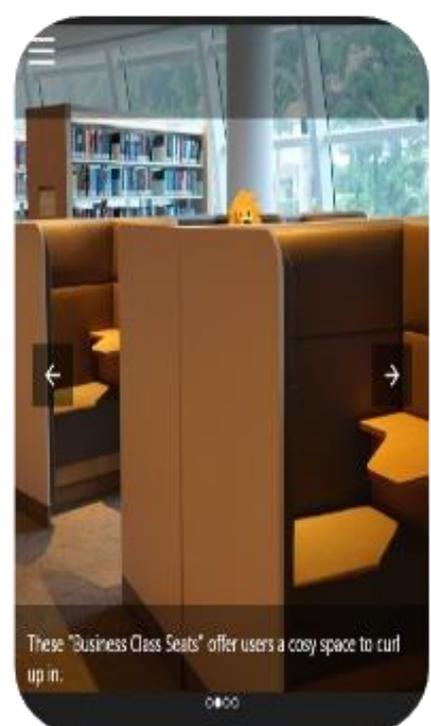
The team agreed to develop a web app as visitors are often reluctant to download a standalone, one-use app. While “Spaces” is in effect a website, it has a mobile-first and responsive web design designed to match the user’s device, which we had intended to be mainly for mobile phones.

In the process of developing the web app, we held a “touchstone tour” (UX research method) with students and discovered that they were using outdated or incorrect names when referring to library areas. Thus, “Spaces” is also a handy digital reference to standardise nomenclature and provide talking points for guides conducting tours. It highlights quick facts for commonly asked questions such as floor area and seating capacity.

We took inspiration from the Cambridge [Spacefinders](#) site to remind ourselves to keep things intuitive and streamlined for users. Later, the team discovered by chance while one of us went on vacation that Macao’s [IACM Building Mobile Guided Tour](#) was very similar in terms of site structure. Great minds think alike!

“Spaces” is now live at library.smu.edu.sg/spaces (best viewed on your mobile phone).

Project team members: Low Jiixin, Ler Wee Hiong, Chai Yee Xin, Galvin Soh, Yuyun Ishak ■■





The Information Technology (IT) Section promotes and advances the application of information and computing technologies to library and information services in all societies, through activities related to best practices and standards, education and training, research, and the marketplace. The scope covers IT for creation, organization, storage, maintenance, access, retrieval, and transfer of information and documents for all types of libraries and information centers; IT for the operation of libraries and information centers; and, related management and policy issues. Of primary importance are applications of IT for supporting access to and delivery of information. In recent years the use of use of technology in libraries have expanded to cover improved machine learning and AI techniques, digital humanities, and data analytics.

The section meets annually at the IFLA Congress; in between congresses, members collaborate with other Sections on programs and workshops. There are election ballots every two years as members complete their 4-year term. The IT Section is one of the largest in IFLA with over 250 members from nearly 70 countries, from all types of libraries, and a range of disciplines. We welcome all members (<http://www.ifla.org/membership>).

The IT Section's website at <http://www.ifla.org/it> has news and resources regarding activities of the Section, session minutes, publications, and membership details. The IFLA-IT email list provides a forum for members to exchange ideas and experience in the use of information and communication technologies in libraries.

The list address is ifla-it@infoserv.inist.fr, and subscription is at <http://infoserv.inist.fr/wwwsympa.fcgi/info/ifla-it>. The Trends & Issues in Library Technology (TILT) newsletter is published twice a year in July and December.

Primary Contacts

Chair

May Chang, University of Cincinnati, United States
may.chang@uc.edu

Secretary

Maria Kadesjö, National Library of Sweden, Sweden
maria.kadesjo@kb.se

Information Coordinator / Web Editor

Joan Wee, Singapore Institute of Technology, Singapore
joan.wee@singaporetech.edu.sg

Standing Committee Members 2013 - 2017

- Hasna Askhita, Syrian Computer Society, Syrian Arab Republic, hasna@scs-net.org
- Khalid Cherkaoui Addahabi, Ecole des Sciences de L'Information (ESI), Morocco, ceghali@yahoo.fr
- Nthabiseng Kotsokoane, Monash University, South Africa Campus. South Africa, Nthabiseng.kotsokoane@monash.edu
- Jie Li, University of South Alabama, United States, jli@southalabama.edu
- Kazuo Takehana, National Diet Library, Japan, k-takeha@ndl.go.jp
- Evviva Weinraub Lajoie, Northwestern University, United States, evviva.weinraub@northwestern.edu

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- Li Chunming, The National Library of China, China, licm@nlc.gov.cn
- Daulat Jotwani, Amity University Uttar Pradesh, India, d.jotwani4@gmail.com
- Youssef Salah, Bibliotheca Alexandrina, Egypt, youssef.salah@bibalex.org
- Shawky Salem, Chairman, ACML-Egypt, Egypt, chairman@acml-egypt.com
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- Lars G. Svensson, Deutsche Nationalbibliothek, Germany, l.svensson@dnb.de

Convenors 2015 – 2017

- Big Data SIG: Wouter Klapwijk, Stellenbosch University, South Africa, Wklap@sun.ac.za
- Linked Data SIG: Astrid Verheusen, Koninklijke Bibliotheek, Netherlands, Astrid.Verheusen@kb.nl

Corresponding Members

- Edmund Balmaves, Prosentient Systems, Australia, ejb@prosentient.com.au
- Emmanuelle Bermès, Pompidou Centre, France, manue@figoblog.org
- Yuri Chernyy, Institute of Scientific Information for Social Sciences, Russian Academy of Sciences, Russian Federation, yuri.chiorny@mail.ru
- Stella Nduka, University of Lagos, Nigeria, stellacnduka@gmail.com