

# Musical Darwinism: The Evolutionary Implications of Indeterminate Notation and its Intersection with a Library 2.0 World<sup>1</sup>

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## ABSTRACT

Since the middle of the twentieth century, composers around the world have used indeterminism at one point in their career, from Dutch composer Louis Andriessen to the use of limited aleatorism in Polish composer Witold Lutoslawski's works. Whilst the new forms of notation presented challenges for performers and analysts of the works, it also presented opportunities for exploration of improvisation and individual choice. There are striking similarities between the freedom represented with this notational evolution to that of the internet to 'Web 2.0.' The proliferation of social networking applications (such as Delicious, Connotea and Diigo) and user generated content create a quandary for libraries and researchers. Should we retain our title as gatekeepers of quality controlled metadata? What role do we play in this new environment? How can we adapt to this shift towards non-hierarchical tagging and uncontrolled vocabulary? Just as composers have decided to give up some control to the performer, should libraries give up a degree of control to researchers in order to keep with the digital times? This paper will seek to answer these questions framed by Charles Darwin's famous espousal of the 'survival of the fittest.' It is the evolution of notation, specifically to indeterminate notation, which may prove ultimately that libraries are no dinosaurs.

## INTRODUCTION

It is fitting on the sesquicentennial anniversary of the publication Charles Darwin's "Origin of the Species" that his well-known maxim, the survival of the fittest, is being realised in today's libraries. The limited (and projected future reductions in) government funding, has had the unintended consequence of creating competition between academic, cultural and heritage institutions dependent on that funding. Further threats include the slow reaction of libraries to the challenges posed by Google and commercially driven internet services which create 'unfair' expectations on the part of our users. In their book *Digital Consumers Reshaping the Information Profession*, Nicholas and Rowlands<sup>2</sup> outline how the landscape of the internet as an e-commerce as manifested in such businesses as Amazon and E-bay have altered library users' expectations of our services. Users have brought their e-shopper mentality due to exposure to faceted browsing, user generated reviews and now 'tagging.' But really, it is Google in particular which has changed the nature of the information profession. In a most extreme apportioning of blame, Google is leading to the downgrading of our

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<sup>1</sup> This paper was first presented at the 2009 International Association of Music Libraries (IAML) and International Musicological Society (IMS) Joint-Conference in Amsterdam, Netherlands.

<sup>2</sup> David Nicholas and Ian Rowlands, *Digital consumers reshaping the information professions* (London: Facet Pub., 2008).

profession. For example, at one of the major London colleges, librarians are being made to reapply for fewer information professional jobs which are now being graded 30% less in salary. However, my focus of this paper is not a tirade on Google or any other specific website but merely to paint the landscape on which we should reflect.

Can anything be done? Well, it is in the changing face of scholarly publishing that open access mandates may yet provide a much-needed lifeline to the libraries. Libraries have always had a primary role as conservators and repositories of knowledge. In the digital age Google is able to operate unchecked as a monopoly thanks to its recent settlement with authors/publishers which shields its future efforts to digitise books in the United States from future litigation. As part of that settlement each library would be guaranteed at least 1 terminal with access to the full contents of its book digitisation project.

If faculty were required to deposit their writings and publications in their respective institution's digital repository, also known as an open access mandate, Institutional repositories (IRs) could then serve as an alternative model to Google. This would only work if faculty were required to do this – as the Senate of the Faculty of Arts and Sciences, the largest constituent group at Harvard voted (the FAS) last year. Libraries would then be able to concentrate on what they do best: advise on the rules for a robust metadata framework and continue to 'conserve' in the digital sense. This model would not be controlled by vested commercial interests and thus would not have to worry about a financial 'bottom line' but would serve as portals providing unfettered access to digital collections without restrictions. The technology to search across digital repositories already exists. OAISTER<sup>3</sup> is a prime example of the power of collocating IR data. Using the Open Access Initiative Protocol Metadata Harvester or OAI-PMH, it draws together over 22million items from over 1100 institutions. One can see why a publisher such as Elsevier would not like this model. It may finally give libraries the leverage they need to properly negotiate meaningful licenses which do not lock in budgets for triennial cycles. It also provides an alternative to searching across freely available, scholarly articles and texts without the need for Google.

So against this backdrop would Charles Darwin be able to divine the survival of libraries? What meaningful adaptations could they adapt to improve their chances along the evolutionary continuum? At this point a hitchhiker's version to the developments in Western music notation may begin to frame possible answers.

## A HITCHHIKER'S GUIDE TO WESTERN MUSIC NOTATION

[image of Guidonian hand]<sup>4</sup>

In the 11<sup>th</sup> century Western music began to be formally codified in this Guidonian hand<sup>5</sup> as a means to organise tones with the solmization of syllables –(or soggetto cavato) a technique manifested in

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<sup>3</sup> "OAister," <http://www.oclc.org/oaister/>.

<sup>4</sup> Some of the original images presented in this version cannot be stored due to licensing restrictions. Those that remain are licensed via a Creative Commons license with an appropriate citation and the required reference.

the work of Josquin des Prez and later codified by Gioseffo Zarlino in the 16<sup>th</sup> century. This would be one of several developments laying out the formal organisation of music (pitch, rhythm, harmony and notation.) Zarlino would also help develop the building blocks of harmonic thinking by re-organising the modes closer to the tonal realm of major/minor.

Notation would also develop conventions based on the performance practice of the day for example, the use of figured bass in Antonio Nola's vocal composition, *Omni tempore*<sup>6</sup>. Unwritten notes borrowing on stylistic conventions of the time, this improvisatory technique could be construed as a composer's 'short-hand'.

[detail from Nola *Omni tempore*]

Nola would be confident that the continuo players of the day would know what he meant. Centuries later interpreters can decipher and replicate the original intention. However, it must be said that this was more than a composer's laziness utilising the figured bass shorthand. It was a conscious decision to delegate to the performer partial control to shape the music.

From that time, music was moving into more complex and more heavily notated territory over this period and it would not be until the middle of the 20<sup>th</sup> century that composers would again revisit a radical shakeup to performer delegated protocols. In the 1950s John Cage was experimenting with chance elements in his compositions. This was the period of *4'33"*. It would be the influence of Eastern philosophy (such as the *I Ching*) which would influence new developments in western notation.

In *Concert for piano and orchestra* (1957-58) Cage describes the piece as a concert rather than a concerto because all of the players, (the pianist and instrumentalists) act as soloists, their parts being totally independent of one another<sup>7</sup>. The piece<sup>8</sup> is scored for piano and separate solos for 3 violins, 2 violas, cello contrabass, flute doubling on alto flute and piccolo, clarinet, bassoon (doubling saxophone), trumpet, trombone and tuba. [Listen to the following short excerpt from the *Concert*.<sup>9</sup>] Cage's notation results in music which sounds and looks very different from the five staff notation which had been developing over the past centuries.

[detail of leave from Cage's *Concert for piano and orchestra*]

It would be a radio broadcast of Cage's *Concert for piano and orchestra* that would seminally alter the music (and notation) of Polish composer Witold Lutoslawski. Up until this point he had employed

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<sup>5</sup> "Thesaurus Musicarum Latinarum," ANOAPM MBAVR114, [http://www.chmtl.indiana.edu/tml/14th/ANOAPM\\_MBAVR114.html](http://www.chmtl.indiana.edu/tml/14th/ANOAPM_MBAVR114.html).

<sup>6</sup> Antonio Nola *Omni tempore / Canto solo: Organo*[1700-1730] <http://internetculturale.it>

<sup>7</sup> James Pritchett, *The development of chance techniques in the music of John Cage, 1950-1956* (UMI, 1989).

<sup>8</sup> John Cage, *Concert for Piano and Orchestra* (New York : HenmarPress, c1960).

<sup>9</sup> John Cage and Nexttime Ensemble., *Dream* (Germany: Wergo, 2009).

quite standard Western notation as found in the *Musique funèbre pour orchestre à cordes*<sup>10</sup> (1958) written for the 10<sup>th</sup> anniversary of Bartok's death.

[detail of opening of Lutoslawski *Musique funèbre*]

But that broadcast awakened in Lutoslawski new possibilities to realise elements which were previously un-notatable. The first pieces composed in this 'mature' style was *Jeux vénitiens* (1961) for small orchestra premiered in Venice and is characterised by a devolved rhythmic structure mobile and *Trois poems d'Henri Michaux*<sup>11</sup> (1962) for two independent groups of different timbres: 20 part mixed choir and orchestra of woodwinds, harp, piano and percussion. There are no string instruments and the two ensembles are led by two conductors: one for choir and the other for the orchestra. And unlike Cage, this is music which is not left to chance.

[detail of Lutoslawski *Trois poems d'Henri Michaux*]

As Ove Nordwall discovered in an interview with Lutoslawski that he controls the form via 'aleatory counterpoint.' He is able to anticipate from the point of view of composition and even in the case of 'the least ideal' of all combinations the demand is made that it shall fit into the formal framework he has constructed, to be a musically adequate realization of his formal intentions<sup>12</sup>.

Post World War II composers placed increasingly unreasonable demands on the precision of the interpreters. Complex rhythmic and notational structures with new extended performing techniques were created to challenge performers. The instrumentalist became more or less a machine or automaton. Lutoslawski was never interested in composing music which was complex for the sake of complexity itself. He had a different departure point in contrast to many of his peers. 'His basic material, the formal bricks and mortar consists of accumulations of sonorities, the integral organisation of which is of microformal importance, the musical structure is only indirectly dependent on simple interval relations. He can achieve a greater genuine complexity of sound than with the realization via instrumentalists of exactly prescribed structures. (Nordwell, 17-21)

Over the following decades Lutoslawski developed his notion and use of aleatoric counterpoint, often juxtaposing these sections with fully notated sections to either draw formal contrasts or a complex sonic blending as in the opening of his 3<sup>rd</sup> Symphony<sup>13</sup> (1984). [Excerpt of the Lutoslawski *Symphony No. 3*<sup>14</sup>]

[image of Lutoslawski *Symphony No. 3*]

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<sup>10</sup> Witold Lutoslawski, *Musique funèbre: pour orchestre à cordes* (Kraków: Polskie Wydawn. Muzyczne; London: J. & W. Chester Ltd., 1958.)

<sup>11</sup> Witold Lutoslawski, *Trois poems d'Henri Michaux, pour chœur à 20 parties et orchestra* (Kraków: Polskie Wydawnictwo Muzyczne, 1964.)

<sup>12</sup> Witold Lutoslawski and Ove Nordwall, *Lutoslawski* (Stockholm: W. Hansen, 1968).

<sup>13</sup> Witold Lutoslawski, *Symphony No. 3* (London: Chester Music, 1984.)

<sup>14</sup> Witold Lutoslawski, *Symphony no. 3 ; Les espaces du sommeil [sound recording]* ([The Netherlands: Philips, 1986).

Following the sonic elements of that opening it is difficult to distinguish the improvisatorial elements from the fully notated elements. The creation of a synthesis of notations places Lutoslawski in a niche of his own. Notation has allowed him to surrender some control of the local musical elements and offers an alternative view to the rigid compositional structures of the time. The evolutionary path notation has taken has been one along a system of developing (and breaking of) rules and controls. The dissemination and realisation of that notation may exist across a variety of mediums but the controls have evolved in tandem. The Library world has also followed a trajectory towards codification of descriptive practices.

## ON A TRAJECTORY TOWARDS CODIFICATION OF DESCRIPTIVE PRACTICES

AACR2R2, Regeln für die alphabetische Katalogisierung (RAK), the French AFNOR, UNIMARC, and eventually RDA have served as sets of descriptive rules and standards used by various countries for the cataloguing of a library's materials. With the onset of the (browsable) digital environment, various new metadata formats have emerged including such floral varieties of MODS, METS, and the librarian's ever-favourite Dublin Core. When one factors in varying classification systems such as the Dewey Decimal system, Library of Congress, and Bliss, it becomes clear that libraries are swimming in an ocean of rules and standards which apply to the physical and digital environment they now inhabit.

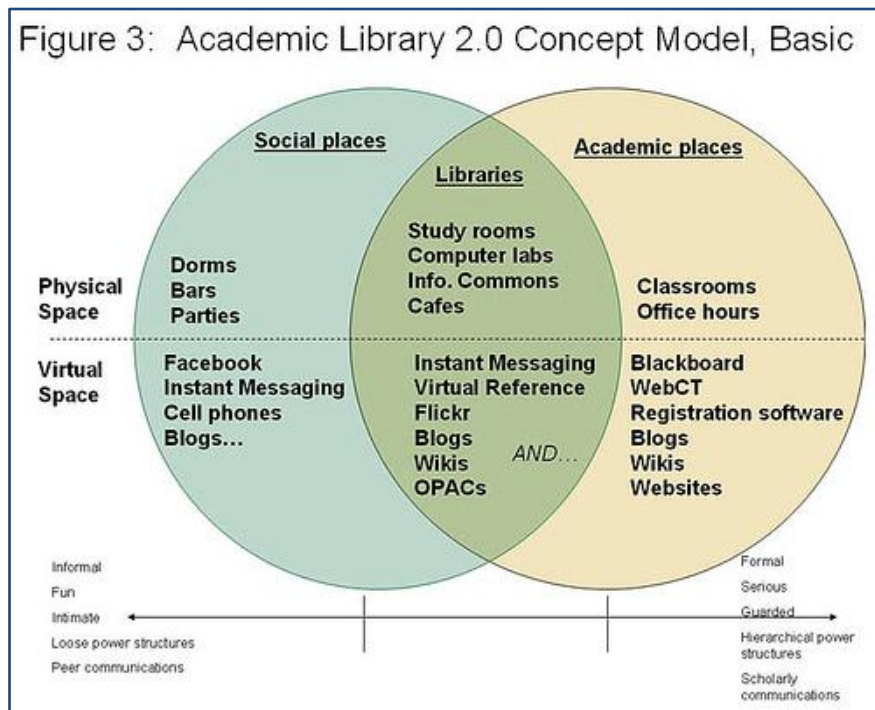
As the great philosopher Ludwig Wittgenstein posited, 'consider for example, the proceedings we call games. I mean board games, card games, ball games, Olympic games and so on. What is common to them all?'<sup>15</sup> After an examination of the elements of these different games, he finds a 'complicated network of similarities overlapping and criss-crossing: sometimes overall similarities, sometimes similarities of detail.' Wittgenstein identifies the intrinsic problem with a rules-based definition in that emphasis should be on the cognitive model which defines the grouping rather than objective rules. For Wittgenstein similarities should focus on relations rather than attributes for it is the connections which drive us to relate and ultimately find objects. However coming back to the Library world, the taxonomic and systematic (hierarchical trees) guiding classification principles since the time of Dewey have barely evolved. The classification system which so well served the 1870s and led to printed cards and eventually machine readable data served eras where there was no visible internet (as with a browser.)

Since that week in October 1996 when Yahoo and AltaVista began to categorise the web, Google has now continued down that path which has resulted in a shift of user enquiries and research away from libraries. Most of a library's functions are undertaken within its local library management software (LMS) from acquisition to cataloguing and circulation and even inter-lending. One of the most visible means of advertising a library's collections to the outside world is its online public access catalogue (OPAC). It is the OPAC which seems to lag behind the functionality found on conventional commercial websites. For example, Amazon began using faceted searching back in 1998 when many libraries were still operating using a telnet interface.

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<sup>15</sup> Ludwig Wittgenstein, *Philosophical Investigations*, 3rd ed. (Oxford: Blackwell, 1967)

Just over a decade later librarians are beginning to map a more realistic landscape. Michael Habib has created the following Venn diagram<sup>16</sup> to depict the new roles of an academic library in a 2.0 environment.



Whilst this does represent much of the activity of a modern academic library, it ignores the fact that research enquiries are bypassing the library completely. Reference and other mediated enquiries are being supported with 'Virtual Reference' and 'Instant Messaging.'

However, the following article<sup>17</sup> from the New York Times from January (2009) may illustrate the problem more clearly. Tyler Kennedy (aged 9) was assigned to research the Australian platypus. It is not as if Google and Yahoo are driving the information retrieval process enough. Explaining his research process, Tyler says 'when they don't have really good results on YouTube, then I use Google.' It is not the fact that the library was not this child's first choice as an information provider. If one leaves aside the misspelled human input metadata one finds on YouTube and across the internet, as well as the related lack of information literacy development described by the UCL CIBER Team<sup>18</sup>, it is not the fact that the library was not the child's first port of call which is so disturbing. It is that a Library's LMS just does not have the power to address, let alone compete, with Youtube and Google.

<sup>16</sup> "Academic Library 2.0 Concept Model, Basic (final version)," <http://www.flickr.com/photos/habibmi/318027172/>.

<sup>17</sup> "At First, Funny Videos. Now, a Reference Tool," *New York Times*, [http://www.nytimes.com/2009/01/18/business/media/18ping.html?\\_r=2](http://www.nytimes.com/2009/01/18/business/media/18ping.html?_r=2).

<sup>18</sup> For more information on the researchers' case study and findings of young people who access information over the internet see "Google Generation : JISC," *Information behaviour of the researcher of the future*, <http://www.jisc.ac.uk/whatwedo/programmes/resourcediscovery/googlegen.aspx>.

Thus, LMS tools do not yet reflect this new world. Federated searching via PRIMO, ENCORE, AQUABROWSER are the latest LMS examples of creating a Google-like library environment but are still limited, even hindered, by the parameters within the LMS. Can they ingest all of the Directory of Open Access Journals? Definitely. How about tapping into all of the OAI-PMH content in Oaister? Maybe. How about all of the video material available across Youtube?



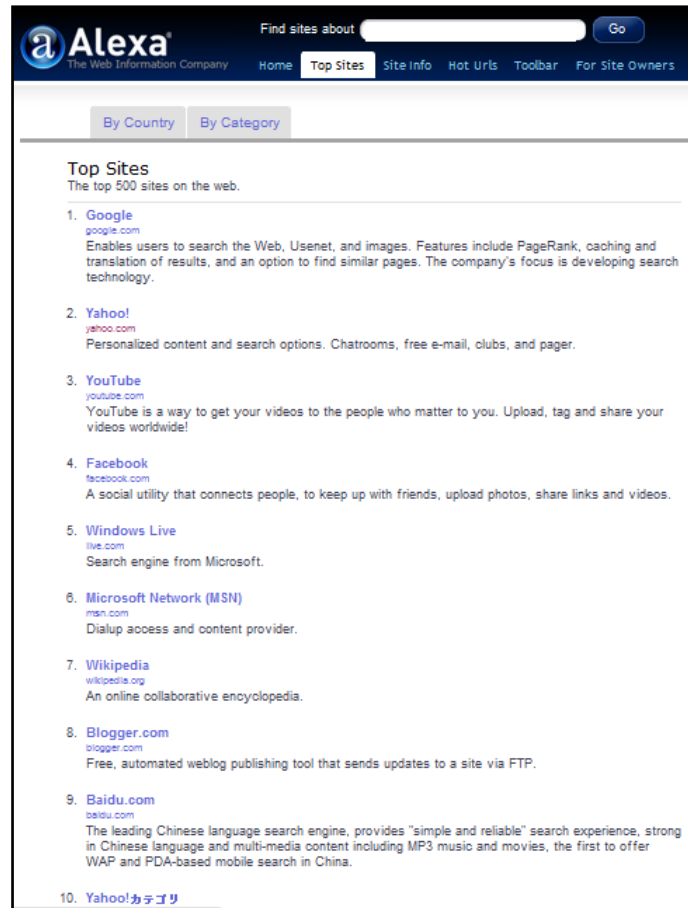
The Web as it exists now is much like this artwork<sup>19</sup> done by a Canadian artist, Maureen Flynn-Burhoe – interconnected like the neurons suggested in the piece. This interconnectedness has realised itself with the growth of social networking sites. After the top search engines (Google, Yahoo and considering the New York Times article with 9-year old Tyler, Youtube) the next top website is Facebook. Does it come as any surprise that no library appears at the top of this list<sup>20</sup>?

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<sup>19</sup> "Digitage Web 2.0," <http://www.flickr.com/photos/oceanflynn/315385916/>.

<sup>20</sup> [www.alexa.com](http://www.alexa.com) measures web traffic and other internet metrics. [Taken on 09 July 09.]





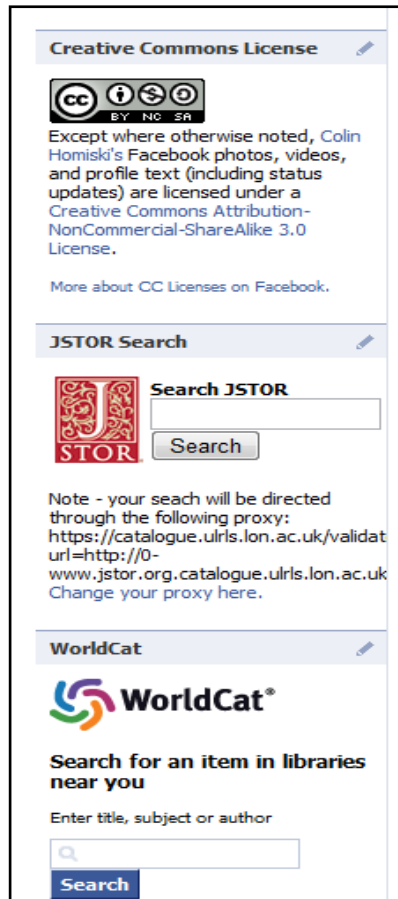
Posted on its blog in April 2009, founder Mark Zuckerberg announced that Facebook had registered its 200 millionth user. About 5 years old, it is remarkable that a website has more than 12% of the world's 1.596 billion internet users<sup>21</sup>. It would be interesting to know how many of them are library users? Can libraries be part of the conversation that goes on there? Marshall McLuhan famously stated the 'medium is the message'<sup>22</sup>. In this case, the internet with its social dynamic as the place 'to be' has forever altered the independent trajectory of libraries. To spin another McLuhan line we are living 'the global village'<sup>23</sup> where interconnectivity of social networks and research and information retrieval are carried out seamlessly. Fortunately the future is not all grim as some library-focused applications have been developed and added within Facebook such as those for JSTOR, WorldCat and COPAC. Once users have added these search boxes (and various authentication protocols for JSTOR) to their profile, they can do all of their research 'within' Facebook without having to leave networking and socialising with friends. Why leave a village which is truly global?

<sup>21</sup> <http://www.internetworldstats.com/stats.htm> measures the number of internet users in the world. [Taken 31 March 09.]

<sup>22</sup> Marshall McLuhan, *Understanding Media: The Extensions of Man* (London: Routledge & K. Paul, 1964).

<sup>23</sup> Marshall McLuhan, *The Gutenberg Galaxy: The Making of Typographic Man* (Toronto: University of Toronto Press, 1962).





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Despite the fact that it does not appear in the top 20 web destinations, WorldCat’s holdings which contain some 1.45 billion items across 139 million bibliographic records, might still be perceived (at least within the library community) as ‘the’ global book catalogue. It is laudable that attempts are made to market their services via social networking sites as demonstrated in Facebook. But a recent survey undertaken by OCLC<sup>25</sup> (2009) reveals the divergent priorities in ascertaining ‘what users and librarians want’ particularly in light of the overall trends in internet activity.

Librarians, according to the survey, are most concerned about duplicate records in WorldCat with 52% favouring any enhancement which reconciles or ‘cleans up’ all of the duplicate records. Users incidentally were after links to more full text (36%) and more subject information (32%). Other requests for Table of Contents (TOC) information and for summaries and/or abstracts were farther down the list.

‘More full text’ is perfectly understandable, even if users may not understand issues of licensing and annual subscription. ‘More subject information’ is a bit more ambiguous and requires further scrutiny. WorldCat’s librarians are unsure how to interpret this. Do users mean they want even more robust subject headings which are labour intensive to create? To scry through the looking glass OCLC has completely missed the rabbit hole. And whilst libraries heavily invest in building top down

<sup>24</sup> A snapshot from my Facebook profile which utilises the JSTOR, COPAC and WorldCat applications.

<sup>25</sup> “Online Catalogs: What Users and Librarians Want,” 2009.  
<http://www.oclc.org/uk/en/reports/onlinecatalogs/default.htm>.

classification and indexable subject taxonomies, the report confirms 'it is unlikely that they mean more controlled subject headings.'

Experience from using commercial sites like Amazon where users can make product ratings, recommendations and add personalised tags, nurtures their understanding and expectations of the online environment. This *Ur*-experience shapes and informs their usability of WorldCat. Why doesn't OCLC see this? When one considers the limited prism of information science, it is no surprise to find boxes of rules of classification, cataloguing, metadata requirements, authority files. Venturing outside of this limited environment, it becomes clear that 'more subject information' must be viewed in context of an *Ur-Gestalt*. Websites (such as Diigo, Delicious, Flickr, Furl, Youtube, Dailymotion) which allow user generated metadata (which will be more fully explored now) have flourished like little green shoots over the past few years and present an alternative layer of subject metadata for the user.

## MAKING THE WEB PERSONAL

Common to all of these websites is the ability of a user to tag and describe an object with vocabulary of his/her choice in his/her respective language. Gone are the structured rules of AACR2, the rigid classifying of topic and the authority files which consolidate and maintain a library's datasets. These uncontrolled keywords inherently possess all of the problems with natural language in all of its homonymic, polysemic, heterophonic and synonymic glory. Cumulatively, the combination of all of a user's tag collection would form what Thomas Vander Wal coined as folksonomy, 'a user-generated classification emerging through bottom-up consensus.'<sup>26</sup>

With all of the linguistic problems coupled with multiple languages operating on a unified platform, why should libraries want to move towards such an unregulated framework? Having examined the most popular internet destinations, a more thorough examination of information behaviour patterns of online users is now in order.

Whilst the CIBER Project group exclusively examined search behavioural patterns in children, the Pew Research Centre (a nonpartisan and nonprofit think tank) has for decades been studying trends and attitudes shaping America. Due to the prevalence of the internet in today's society, Pew studies its impact on 'families, communities, work and home, daily life, education, health care, and civic and political life.'

A Pew Internet and American Life Project report<sup>27</sup> published in December 2006 revealed that 28% of internet users have tagged or categorised online content. Although the Pew's work is limited in that its studies are limited solely to American users, their work is thorough and one could infer that these issues and trends are similar across industrialised countries (i.e. such as the G20 grouping of

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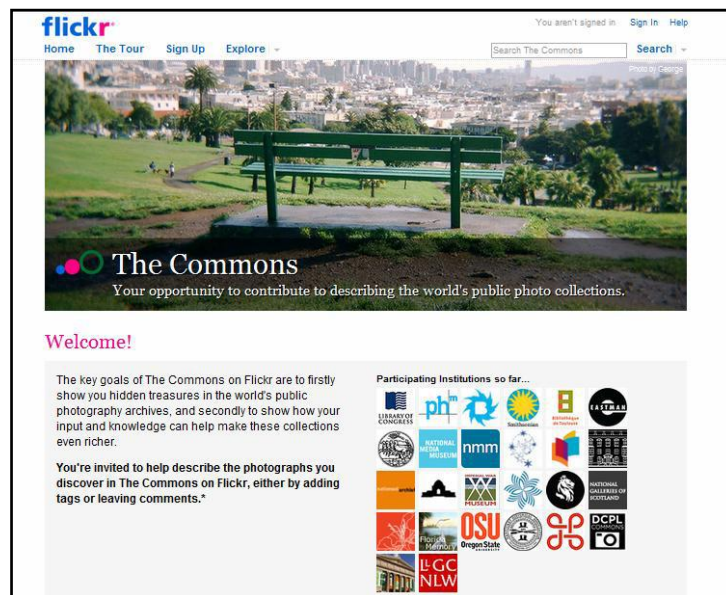
<sup>26</sup> "Folksonomy," <http://www.vanderwal.net/folksonomy.html>.

<sup>27</sup> "Tagging | Pew Research Center's Internet & American Life Project," <http://www.pewinternet.org/Reports/2007/Tagging.aspx>.

nations). Although this report is a couple years old, one would expect that there is wider diffusion now of tagging and categorisation of online content as the next case study will attest.

Some cultural institutions, such as the National Library of Australia in 2007 and the Library of Congress in 2008, have allowed some of their digital collections to be uploaded on Flickr to increase the exposure of their collections and open them up to a wider audience. Flickr is one of the websites (which does make the top 20) mentioned earlier which allows users to upload personal pictures and share privately or across the network with varying degrees of Creative Commons Licenses. Photographs are catalogued freely by individuals using a folksonomic approach.

As part of this pilot project, the Library of Congress (LOC) placed 4615 of its over one million digitised images onto the Flickr Commons<sup>28</sup> which is a distinct but totally integrated section of Flickr which has the collections of around 30 partner cultural institutions freely available and searchable and describes itself as 'your opportunity to contribute to describing the world's public photo collections.'



As of October 2008 when the LOC data was analysed<sup>29</sup> 61,176 tags were created by 2518 unique Flickr accounts and added to the digital collection's metadata. The integrity of the metadata was improved by individuals who were local experts on some of the previously unidentifiable pictures<sup>30</sup>. Traditional librarians have noted that such an unregulated user generated system of keywords may result in the placement of random, inaccurate or inappropriate tags to the record. However, there were less than 25 instances of user-generated content which required removal from the 7166 comments left on nearly 2873 pictures.

<sup>28</sup> [www.flickr.com/commons](http://www.flickr.com/commons)

<sup>29</sup> Michelle Springer, Beth Dulabahn, et al., *For the common good: the Library of Congress Flickr Pilot Project*, [www.loc.gov/rr/print/flickr\\_report\\_final.pdf](http://www.loc.gov/rr/print/flickr_report_final.pdf)

<sup>30</sup> The improvement of the metadata due to the contribution of strangers builds on the phenomenon of crowd sourcing and group intelligence. For further information on these two phenomena consult Clay Shirky, *Here comes everybody how change happens when people come together* (London : Penguin, 2009) and James Surowiecki, *The wisdom of crowds why the many are smarter than the few and how collective wisdom shapes business, economics, societies, and nations* (London : Little, Brown, 2004).

Once a collection has been opened up, it is clear that tagging improves and increases resource discovery. As David Weinberger has remarked ‘everything is connected and therefore everything is metadata<sup>31</sup>.’ It has become apparent that the LOC has realised the benefit of giving up some control to the user. ‘More than 500 records have been enhanced with information provided by the Flickr community.’ Indeed future initiatives include populating the bibliographic records with tags labelled as uncontrolled index terms (MARC 653). This fusion of MARC and folksonomy may prove an endearing legacy to future information resource discovery mechanisms. It should be stated that the LOC pilot project built upon a similar attempt at tagging undertaken by Australian and New Zealand cultural institutions such as the Powerhouse Museum, Picture Australia (federated picture collections managed by the National Library of Australia) and NZMuseum.

Quite simply, tagging demonstrates continued relevance in a dynamic world. Some librarians have to maintain a set of URLs, links of relevant resources for our respective subject communities. For music, one of the classic meta-websites available is the Royal Holloway Golden Pages<sup>32</sup> which attempts a Yahoo-like categorisation of music related webpages. The problem with such a structure is that it does not allow granular horizontal searching of resources. It is also a top-down approach which limits information retrieval. Some Google functionality has been added for the ‘Conferences’ tab but one is limited to keyword periodicity.

The screenshot shows the website for the Department of Music at Royal Holloway University of London. The page is titled 'The Golden Pages' and is subtitled 'Links for musicians on the WWW'. It includes a disclaimer stating that the links are offered informally and do not reflect the department's opinions. Below the disclaimer, there are two sections: 'Classified links' and 'Unclassified links (alphabetical)'. The classified links list 14 categories such as 'Bibliographical aids and links', 'Bookshops and other sources for buying books and music', and 'Conferences in music'. The unclassified links list three specific resources, including the 'Aberdeen Bach Choir' and 'Academic music resources on the Internet'.

So experiments with various social bookmarking services and the creation of folksonomies via tagging have been undertaken as a part of this research. Websites such as Furl, Diigo and Delicious allow the researcher to save an URL and add tags for categorisation and even more personalised

<sup>31</sup> David Weinberger, *Everything is miscellaneous the power of the new digital disorder*, 1st ed. (New York: Times Books/Henry Holt and Co., 2007).

<sup>32</sup> <http://web.me.com/jpehs/golden-pages/Index.html>

idiosyncratic retrieval (e.g. the tag '4resproj' which could be translated into 'for this research project').

In addition to finding a solution for searching across hierarchical categories (i.e. music facets), these experiments have led to a prototype for a metadata framework in the social bookmarking website Delicious. This so called SoBoMeF or Social Bookmarking Metadata Framework, attempts to pull together resources which would not normally be ingested by the normal means (aggregated via OAI-PMH) or which remain outside the scope of current LMS such as a video from Dailymotion or Youtube.

Coupled with the linguistic problems mentioned earlier, these folksonomies have the additional problem of tag disambiguation. This would not be a problem for semantic systems as those have been discussed throughout this conference. Does the 'SF' in Delicious stand for San Francisco or Science fiction? Does the tag 'metal' pertain to metallurgy or heavy metal music? Clustering and the use of limited taxonomical structures may provide a solution to this. If one continuously adds more and more keyword - tags, it should disambiguate and cluster the relevant URLs.

## DEFEATING DISAMBIGUATION WITH SOBOMEF

Before departing too far away with this technical jargon, it is the end-user that is most paramount. This new SoBoMeF framework will be meaningless unless researchers can readily identify the benefits and strength of the system and it is readily usable. How will the users approach Music Research 2.0?

The image shows a screenshot of a search results page for Stravinsky-related content. The results are listed with their titles, dates, and tags. Annotations are present:

- A red arrow points to the first result: "Stravinsky - Symphonies of Wind Instruments In Rehearsal from 1947".
- A red arrow points to the second result: "Igor Stravinsky - Le Sacre du Printemps (Esa Pekka Salonen, cond)".
- A blue arrow points to the third result: "Le Sacre du Printemps: d' Stravinsky a Jaume Vidal. Anàlisi d'un transvasament alfabètic (Rosa Comes Casas)".
- A blue arrow points to the fourth result: "STRAVINSKY: Le Sacre du Printemps (1940) Audio Recording".
- A blue arrow points to the fifth result: "Stravinsky: classic humanist (Heinrich Strobel trans by Hans Rosenwald) e-book".
- A blue arrow points to the sixth result: "An analysis of Stravinsky's Three Japanese Lyrics (Peter Kaminsky): E-thesis".
- A blue arrow points to the seventh result: "Stravinsky and the Rite of spring: the beginnings of a musical language (Van den Toorn)".

The search results include various tags such as "audio", "symphonies", "wind instruments", "recording", "streaming", "rehearsal", "stravinsky", "esa pekka salonen", "la philharmonic", "los angeles", "performance", "rite", "spring", "sacre", "printemps", "audio", "videos", "youtube", "playlist", "clips", "stravinsky", "analysis", "music\_theory", "rite", "spring", "sacre", "printemps", "rosa", "casas", "french", "article", "pdf", "stravinsky", "audio", "recording", "sacre", "printemps", "rite", "spring", "download", "streaming", "78rpm", "new", "york", "philharmonic", "orchestra", "stravinsky", "e-books", "research", "musicology", "russian", "biography", "criticism", "analysis", "heinrich", "strobel", "hans", "rosenwald", "humanist", "merlin", "press", "stravinsky", "analysis", "japanese", "lyrics", "peter", "kaminsky", "theory", "20th\_century", "music", "music\_theory", "theses", "university", "rochester", "download", "stravinsky", "music", "musicology", "analysis", "classical", "music\_theory", "e-books", "20th\_century", "harmony", "free", "rite", "spring", "sketches", "university", "california", "press", "composers", "contemporary", "stravinsky", "archive", "music", "sketches", "manuscripts", "20th\_century", "21st\_century", "composers", "berio", "lutoslowski", "boulez", "gubaidulina", "andriessen", "madama", "webem", "varese", "sacher", "foundation", "stravinsky".

As a part of this experiment, hundreds of URLs related to music across the web have been bookmarked and tagged in Delicious. In the following example<sup>33</sup>, all of the URLs related to 'Stravinsky' have been retrieved from my Delicious bookmark feed. The red arrow indicates recordings of Stravinsky's *Le Sacre du Printemps (Rite of Spring)* drawn from across websites such as the Internet Archive and Youtube. The blue arrows indicate texts on Stravinsky which include an e-book from the University of California's e-Scholarship edition, an e-thesis from the University of Rochester, an e-book outside of copyright scanned by Google and an article. Certainly Oaister would harvest some of these digital surrogates but the recordings as well? What LMS would be able to harvest them? That is the power of social bookmarking and folksonomy, offering a new path for librarians and libraries towards the management and retrievability of digitally born objects.

SoBoMeF emulates elements of FRBR (Functional Requirements for Bibliographic Records) such as the source/object and MARC fields incorporating parts of the 008, 100, 245, 300, 650, and 856. In this manner faceted searching can be undertaken according to source such as 'youtube' or 'daily' 'motion' or format such as 'e-book' or 'e-thesis'. Will this replace a taxonomic metadata framework? SoBoMeF aspires to respond to the inflexibility of MARC and other rules-based approaches. Folksonomy provides a flexible (i.e. bendable) structure to allow for the creation of new media and genres across the internet. Library standards have not. The creation and use of MARC 856<sup>34</sup> would be a good example of how one field cannot describe the variety of genre available now on the internet. Even with appropriate and robust delimiters it is obvious that the benefits involved would not be cost-effective to create and still not easily allow cross-searching in a meaningful way for researchers. This is not to say that improvements should not be made! Catalogues (and search retrieval) can certainly be improved with hybrid models such as that offered by LibraryThing<sup>35</sup>.

In addition to personalisation, Web 2.0 offers mashups (or hybrid combinations) of technologies. LibraryThing allows anyone to become a cataloguer. About a million individuals catalogue books and share their respective metadata and personalised tags. The San Francisco State University Library created a mashup of their OPAC with LibraryThing and represents another evolutionary step. It is a simple java script that creates the tag cloud and talks with LibraryThing. So for example, the Library's bibliographic record of Stravinsky's score of *The Rite of Spring*<sup>36</sup> is enhanced with uncontrolled keywords such as 20<sup>th</sup> century / modernist, etc. to improve information retrieval.

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<sup>33</sup> [www.delicious.com/colin71/stravinsky](http://www.delicious.com/colin71/stravinsky)

<sup>34</sup> <http://www.loc.gov/marc/856guide.html>

<sup>35</sup> [www.librarything.com](http://www.librarything.com)

<sup>36</sup> <http://opac.sfsu.edu>



The screenshot shows the Investigator Catalog interface. At the top, there's a search bar with the text 'stravinsky igor rite spring'. Below the search bar, there are several buttons: 'Start Over', 'Request Item', 'Save to Book Bag', 'MARC Display', 'Return to List', 'Modify Search', 'Another Search', and 'LINK+ Search of'. The search results show 23 results found, sorted by relevance. The first result is for 'The rite of spring / Igor Stravinsky'. The record view shows the following details:

- Author: Stravinsky, Igor, 1882-1971
- Title: The rite of spring / Igor Stravinsky.
- Alt Title: Sacre du printemps
- Publ/Date: New York : Dover, 1989.
- Subject: Ballets -- Scores.

The record view also includes a table with columns for LOCATION, CALL #, and STATUS. The table shows the following information:

LOCATION	CALL #	STATUS
Main Collection Score	M1520.S913.S3x	AVAILABLE

A red box highlights the 'LibraryThing Tags' section, which lists the following tags: 20th century ballet, classical, classical music, France full score modernist, music, score music scores musical score Orchestra, and Stravinsky.

Will folksonomy open a new war against the controlled rules and standards libraries have always protected? If libraries are open minded and view these evolutionary trends contextually. Probably not. Certainly the web statistical data and information seeking behaviour speaks for themselves. There will certainly be pressure to do so especially with all of the financial pressures confronting academic libraries internationally. Two recent reports by the Association of Research Libraries (ARL) and the Council on Library and Information Resources (CLIR) make their position clear. An ARL Strategic Plan Review Task Force has recommended that in these challenging times to 'push libraries to construct new forms of engagement and support.'<sup>37</sup> Certainly the movement towards digital resource has not gone unnoticed by CLIR who note critically, 'libraries tend to be risk-averse organisations; to remain relevant, they must be willing to experiment and innovate.'<sup>38</sup>

Libraries cannot afford to ignore these trends in order to 'remain relevant.' Degrees of control have always been at the heart of information science. Can an uncontrolled system be regulated? Die-hard cataloguing apparatchiks will undoubtedly say no but organisations such as the Digital Library Federation do have a more inclusive view of the future.

In their recent report on *Future Directions in Metadata Remediation for Metadata Aggregators*, the authors respond to the following desired service request, 'Increase available search terms in records by incorporating user-suggested tags into metadata.' The report's principal author, Greta de Groat writes, 'for metadata formats that support it, tags could be harvested and inserted into subject fields, marked with their source. Alternatively, the terms could be housed separately from the metadata but aggregated together.'<sup>39</sup> That indeed would keep libraries relevant.

<sup>37</sup> Association of Research Libraries, (2009) *Transformational Times: An Environmental Scan Prepared by the ARL Strategic Plan Review Task Force* [www.arl.org/bm~doc/transformational-times.pdf](http://www.arl.org/bm~doc/transformational-times.pdf)

<sup>38</sup> Council on Library and Information Resources, (2008) *No Brief Candle: Reconceiving Research Libraries for the 21<sup>st</sup> Century* <http://www.clir.org/pubs/abstract/pub142abst.html>

<sup>39</sup> Greta de Groat, *Future Directions in Metadata Remediation for Metadata Aggregators* (Digital Library Federation, 2009) [www.diglib.org/aquifer/dlf110.pdf](http://www.diglib.org/aquifer/dlf110.pdf)



## A CIRCLE OF RULES

This really brings us full circle with the levels of control found in Witold Lutoslawski's music. Although he himself represents one step on the evolutionary ladder of notation standards, his rung represents the best of both worlds, a hybrid for the library and information profession to learn from and emulate. Lutoslawski still wanted large structural control over his composition. Performances of his work would still be recognisable as in the *Symphony No. 3* but he allowed for little variations at the microlevel (i.e. the performer) to improve the work and contribute to each performance's uniqueness.



Similarly, the Library world needs to loosen its requirements and rules so that information retrieval possibilities are maximised. Folksonomy does not represent the end of authority control, merely the next rung up the evolutionary chain of metadata. If there are any lessons from the SoBoMeF experiment, it is that tags improve information retrieval and allow the researcher the ability to map the digital objects they encounter over the course of their research on the internet. Even the best LMS in the world cannot do that. So, Music Library Research 2.0 will need to carry degrees of personalisation, individualisation and customisation. The LMS (and the rules governing it) will need to be interoperable with social networks and other third party systems and perhaps most importantly, be characterised by a folksonomic foundation. As the internet continues to evolve, libraries must not use dinosaurs as their role model and be relegated to maintaining a few special and historic collections amidst the digital world. They must take up the mantle of possibility and chance and put it at the heart a new operating model for the future. Only then will libraries remain relevant and survive as the fittest.

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<sup>40</sup> <http://www.flickr.com/veggielasagna>