

talis



Library 2.0

The challenge of
disruptive innovation

A Talis white paper

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A note from the author

Interest in a concept called 'Library 2.0' has been building for a while. In October 2005, 'Web 2.0: Building the New Library'¹ appeared in the online journal, *Ariadne*. The same month, Ken Chad, Executive Director at Talis, spoke about Library 2.0 at the Public Library Authorities conference². In November of that year, Talis released a white paper entitled *Do Libraries Matter? The rise of Library 2.0*³.

In that paper, Talis applied a term first coined by Michael Casey, Library 2.0⁴, to a number of social and technological changes that we perceived to be having an increasing impact upon libraries, their staff, their audiences, and how they could interact. It served as our contribution to the wider discussion of Library 2.0 and, we believe, helped to move that discussion forward.

This paper builds on those core ideas, proposes solutions and challenges the stakeholders in the global Library domain. It also illustrates some of the many ways in which Library 2.0 is being made real, today, around the world.

Library 2.0 as a term remains the subject of some debate. To us, it continues to fulfil a purpose as a convenient label for the ideas contained within these pages. Those who object to the term, for whatever reason, should be careful not to dismiss the underlying trends and messages along with the label.

We hope that this paper will help identify ways in which new models built atop the solid foundations of a robust, valuable and valued library service will reap rewards for libraries. We look forward to your thoughts, and to working with you to deliver on the Library 2.0 promise.

¹ Web 2.0: Building the New Library, by Paul Miller. *Ariadne* 45, October 2005.
<http://www.ariadne.ac.uk/issue45/miller/>

² A paper based upon this presentation appeared in the December issue of the *Public Library Journal*, and is reproduced at <http://www.talis.com/resources/documents/pla2005.pdf>

³ *Do Libraries Matter? The rise of Library 2.0*, by Ken Chad & Paul Miller, remains available online at http://www.talis.com/downloads/white_papers/DoLibrariesMatter.pdf

⁴ The first use of Library 2.0 appears to have been by Michael Casey, on his LibraryCrunch blog, in September 2005. There is an evolving Library 2.0 definition on Wikipedia at http://en.wikipedia.org/wiki/Library_2.0.

Executive summary

The information environment within which libraries find themselves is changing, probably faster than ever before. These changes offer great opportunities for progressive libraries to reach out far beyond the boundaries of their buildings and web sites, and to engage with an increasingly literate body of information consumers.

Amazon, Google, eBay, Skype and the other darlings of the Information Revolution do not threaten the progressive library. Rather, they create whole new opportunities for us to engage with an empowered, interested, and skilled set of audiences.

Similarly, the techniques and technologies that have enabled these new organisations are also suitable for deployment within our libraries, to enhance the ways in which we make our own data work for ourselves and our visitors.

Library 2.0 is a concept of a very different library service, geared towards the needs and expectations of today's library users. In this vision, the library makes information available wherever and whenever the user requires it, and seeks to ensure that barriers to use and reuse are removed.

Talis is developing a new Library 2.0 software platform that is changing the way in which we think about the library space, and the ways in which we work are changing to match. This paper lays out some of our thoughts on the present and the future, and invites all of you to join us in building better libraries for users both real and, as yet, unmet.

External trends

Libraries, and the services that they offer, exist within a broad landscape of free and charged information services. Users of library services also use - and are informed by - this wider set of online services.

The trends we observe in the ways that people today communicate, interact, acquire and share knowledge, search, investigate, and participate in the creation and re-mixing of new content, will clearly have an impact upon the library, its services, and expectations of both.

So what is driving changes in the way users want to access information and, in light of this, what exactly does the modern information service look like?

Connectedness

The Internet, and its most common manifestation in the form of the World Wide Web, has made a profound contribution to modern life. Increases in web usage continue to be dramatic with, today, more than 900 million users⁵ of a tool that has really only existed for a decade. Those of us who have seen the Internet evolve often find it difficult to remember life before, and those who have grown up with it accept it and integrate it into their lives without question.

To many, it is now ubiquitous. It is increasingly 'available', and broadband is replacing 'dial up' giving us an 'always on' experience. This ubiquity is increasingly embracing multiple device types, including mobile phones, game consoles, and televisions. New solutions have been designed to meet the demands of today's users, who increasingly expect comprehensiveness and speed but also simplicity and elegance. Consequently, organisations can position themselves as having the "Earth's biggest selection" (Amazon), or profess a mission "to organize the world's information and make it universally accessible and useful" (Google), or capitalise upon the growing number of digital cameras owned by people with broadband connections and geographically dispersed friends and family (Flickr).

To avoid disintermediation, libraries must compete for attention, partly through their own web presence but also by innovative interaction with other web applications and services. The increasingly comprehensive nature of search engines creates an impression (and expectation) that anything is discoverable online. The gatekeepers of content do themselves few favours

⁵ Figures at <http://www.internetworldstats.com/> from 21 November 2005 estimate that there were 972,828,001 Internet users worldwide.

by hiding their existence from these search engines, aggregators and developers. This land of ‘walled gardens’ is not sustainable in our view.



The New York Public Library, one example of the current generation of libraries visible on the web.

Despite the undeniable rise of an online information market, recent figures from a survey⁶ of over 3,000 current Internet users in six countries suggest that a remarkable 96% have visited a public library in person, at some point in their lives. However, only 27% of respondents have visited the *web site* of a public library, a figure that rises as high as 42% in Canada, but drops to a mere 9% in the UK.

Amongst college students⁷ questioned during the survey, 73% claim to have used the resources of a physical library whilst 47% have accessed it online.

These figures, and their exploration within the report from which they are drawn, suggest that the idea of the library remains important to people, and that the continued role of the physical library space should not be underestimated.

The reason for this seems obvious. Information consumers, whether Internet users or not, make use of libraries for a wide range of purposes, from borrowing or otherwise interacting with books, journals, music or film, through to engaging with library staff and others in a safe and accessible social space.

⁶ OCLC's 2005 publication, *Perceptions of Libraries and Information Resources*, reports on a survey of 3,348 Internet users from Australia, Canada, India, Singapore, the United Kingdom and the United States, and is available from their web site at <http://www.oclc.org/reports/2005perceptions.htm>. OCLC's Vice President for Member Services, George Needham, speaks about this research in a *Talking with Talis* podcast at http://talk.talis.com/archives/2005/12/george_needham.html.

⁷ Given the rather different definitions of 'college' across the geographies included in their survey, it is worth explaining that OCLC defined college students as "postsecondary students, both graduate and undergraduate, responding to the survey".

The Internet inside and Web 2.0

As a result of this connectedness, and driven by global open standards and a resilient infrastructure, the web, and its dominant interface in the form of the browser, has established itself as the window to the world of content. Even traditional desktop applications integrate services and data elsewhere on the network in an increasingly seamless fashion, blurring the boundaries between the local and the remote, that which is yours to control, and that which is yours to use.

All current generation web sites are available for use predominantly in human readable form, but the real power of the web will be unleashed when new applications can be built from functions and data assembled at the point of need from an underlying platform of software components (so called Web Services).

Web 2.0 is the label attached to these new capabilities of the next generation World Wide Web. The October 2005 *Ariadne* article⁸ explores this idea, drawing upon the most coherent single expression of the whole, as provided by Tim O'Reilly⁹.

O'Reilly summarises his longer paper, offering the following concise definition;

“Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences.”¹⁰

Essentially, Web 2.0 offers a means by which data and services previously locked into individual web pages for reading by humans can be liberated and then reused, in ways sometimes referred to as ‘mashing up’ or ‘mixing’. Importantly, it also introduces the notion of a ‘platform’, meaning that others can build applications on pre-existing foundations and thus benefit from economic scale without reinvention.

⁸ Web 2.0: Building the New Library, by Paul Miller. *Ariadne* 45, October 2005. <http://www.ariadne.ac.uk/issue45/miller/>

⁹ *What is Web 2.0?*, by Tim O'Reilly. September 2005. <http://www.oreilly.com/go/web2>

¹⁰ Web 2.0: Compact Definition, by Tim O'Reilly. *O'Reilly Radar* blog, 1 October 2005. http://radar.oreilly.com/archives/2005/10/web_20_compact_definition.html

With the emergence of Web 2.0 software platforms, leading sites such as Google, Amazon, eBay now provide their functions via such components (Web Services) that other computers can discover and consume to create new applications.

Changing economics

These trends bring significant challenges to the computing industry, especially in terms of changing economic models that threaten unenlightened incumbents. Many new services offer free access to data that was previously unavailable, highly fragmented, or behind payment barriers. This does not mean that there is no cost associated with creating and sharing data, but rather that the ways in which value is measured are shifting. Often, these services are supported by advertising, or exist to drive a proportion of their traffic towards a higher value proposition (up selling), for which there are incremental charges.

Some vendors have already adopted this model. Sun Microsystems, for example, makes its Solaris operating system available for free, seeking to recoup revenues previously generated by software licenses by selling support, services and of course hardware to a consequently larger base of Solaris users. Others, such as Salesforce.com, offer pay-as-you-go subscription services that leverage many of the same ideas to offer a robust and ever-improving suite of functionality whilst freeing subscribers from the need to run their own systems internally. The impact of Apple's iPod, with its close ties to the online iTunes Music Store is another obvious example of a changing economic model for software and content.

The open source model that describes the community software development process is dramatically changing the economics of software, with value moving from the source code itself toward the inherent value of the community. New economic models will also apply to applications, and to the data that they use, create and aggregate.

Library software vendors (including Talis) will not be insulated from these disruptive trends. Vendors need to recognise that value is shifting. Libraries and those that fund them (that is all of us, directly and indirectly) are rightly seeking returns on investment and are demanding more value *and* at lower cost – a tough conundrum for those unable to innovate and morph (in some cases reinvent) their businesses to adapt to these disruptive challenges.

We all need to address the business and technology strategies that will liberate data and applications which have hitherto been protected by unsustainable business models with high maintenance charges, increasing rather than lowering costs of ownership, and a lock-in to monolithic applications with high switching costs.

So what does all this mean?

All these factors combine to create a new paradigm for all stakeholders – including libraries themselves, their users, content authors, publishers and software vendors. The Library 2.0 label reflects revolution more than evolution, which we believe accurately depicts the new opportunities and the impending challenges facing software vendors.

The library domain has repeatedly evolved to embrace new technologies and to adapt in line with changing expectations, and it will doubtless continue to do so. However, it is our view that the current challenges are more subtle, more significant, and thus more disruptive than in the past.

For example, user expectations have moved. Amazon provides a global catalogue of in print and out of print books, Google provides an index to the web with free search and (increasingly) to digitised book content. Flickr has enabled anyone to ‘tag’ their photos and use this ‘metadata’ to better enable sharing or personal rediscovery of resources. Netflix is effectively an online borrowing service for DVDs.

Some librarians may perceive a threat from these commercial services providing, as they do, a more enticing user experience than the traditional library OPAC. In short, there is a sense that they can provide all the resources the user requires plus super slick fulfilment mechanisms.

However, in reality the growth of participation and the ability of people to find, and be enriched by, a wealth of experiences is to be welcomed. There is no reason why some of these ideas cannot be adopted by those libraries and librarians that are prepared to engage with these trends, and to deliver upon their historical core values in innovative new ways.

What good librarian would choose to hand ‘truth’ down from the shelves to those who then passively consume it, rather than engage in a dialogue with participative lifelong learners? Is it not preferable to help users build their understanding of the world around them with reference to a wealth of experiences from across formats, media, contexts, and their analogue and digital manifestations?

Library 2.0 examples

Many examples that might be considered aspects of a Library 2.0 approach exist, and innovators around the world continue to demonstrate that which might be possible.

Remixing library services

Fundamental to the changes we anticipate for libraries is a shift from the delivery of a library service just within the library building, or simply from a library's own web site.

Consequently, as well as continuing to offer services to those who come to us, we need to reach beyond the boundaries of the library space, and begin pushing services out to people in the places where they are already interacting. For example, new technologies and new attitudes make it eminently feasible to break the OPAC down into a set of functional components, and to make each of those components available for inclusion in almost *any* page on the web, whether library-focussed or not. The OPAC itself is enriched by this approach, and the services formerly available only via the OPAC become far more widely available, and consequently far more valuable.



Talis' Prism 3 demonstrator is illustrating ways in which basic bibliographic data in the catalogue can be enriched, for example with book jackets or information on stock held at other libraries.

Liberating library functions and data from hitherto closed systems enables users to use their library content and services in other contexts. For example, catalogue searching or loans information should be available to a student within their Course Management System or Virtual Learning Environment. Information on fines should be available within a financial application and perhaps both of these should be visible from an institutional portal.



Library account information visible in the institutional portal at University College Dublin, courtesy of Talis Keystone.

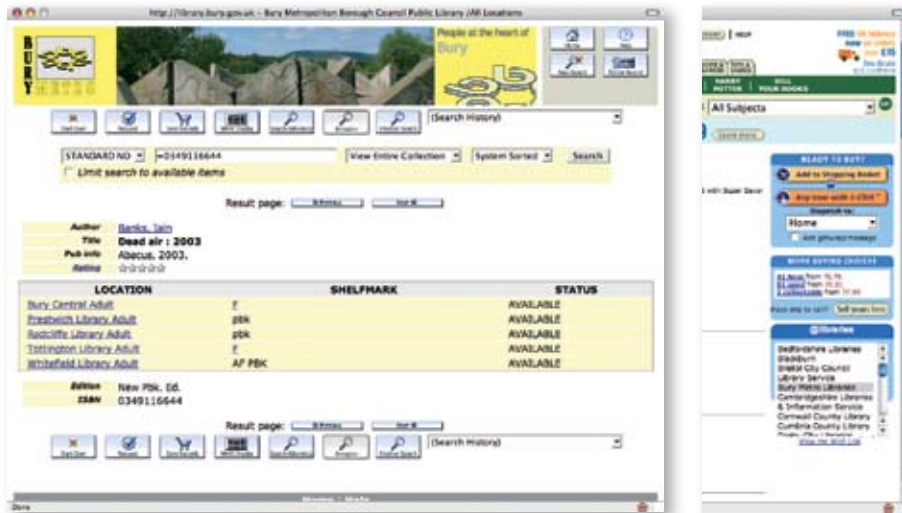
It is not only data reflecting an information consumer's interactions with the library that should be made available, however. In a different context, it is also important to ensure that information about the resources available from the library is disseminated as widely as possible, and made available in a manner that enables integration with other applications beyond the library's control.

One of the most frequently cited places in which such integration might usefully occur is, of course, Amazon. Since Jon Udell's useful LibraryLookup tool¹¹ was first released back in 2002, a wide range of scripts, plug-ins and toolbars have been produced to enable a user to check whether or not an item being viewed on Amazon is also available within their own library¹².

The majority of these tools require someone to have downloaded and installed them before they can be used, and they also tend to be limited to providing information about a single library. As such, they are perhaps best suited to use on computers within a library, where a system administrator can install them, and where users searching Amazon can be directed to copies of the books located within the building they are in.

¹¹ LibraryLookup remains available at <http://weblog.infoworld.com/udell/stories/2002/12/11/librarylookup.html>.

¹² See http://www.libsuccess.org/index.php?title=Web_Browser_Extensions#User_Scripts for one list of such tools.



Library data meets the needs of a wider range of potential users when it appears sensibly outside the library context. Here, information on libraries holding a copy of a book is displayed in Amazon, and clicking on the link takes the user straight to an individual library's holdings information for the item.

Moving the library boundaries

As library services become more visible in a range of contexts, the incentives to challenge certain aspects of the ways in which we traditionally operate grows. In many parts of the world today, an individual will be a member of a single, local, library, probably associated with the local government area in which they happen to live. They may work close to other libraries, or they may live in an area in which there are other libraries within reach, but they will tend not to have access to the services offered by these libraries. The question is: does a model in which an increasingly mobile population is able to view but not use the services of libraries other than that offered by their home city, county, or equivalent make sense any more?

We are seeing some moves towards collaborative access agreements and even discussions about national entitlement, but at what point will this trickle become the flood that makes the traveller or commuter routinely consider using a library in a strange town in the same way that they might today seek out a Starbucks for coffee or wi-fi?

Moreover, should a library that is unable to fulfil a request for an item immediately (either because the item is on loan, or because it will have to be borrowed from another library first) inform the potential borrower that the item may well be available more quickly from a third party source such as Amazon? This would, perhaps, allow them to make an informed decision as to whether or not the cost of buying via Amazon is preferable to waiting for the library to obtain a book for lending.

Information that is easily discoverable

As well as exposing basic information about the institution and its services, the open library should seek to enable discovery, locating, requesting, delivery and use of the resources in its care. Physical library holdings, for example, might usefully become far more visible than they are now. OCLC has made important progress in this area, and their OpenWorldCat¹³ initiative allows searchers to find books held by participating libraries in popular search engines such as Google and Yahoo!. How much further might we go, though, in enabling the discovery of our holdings, and in allowing anyone wanting access to them to receive a copy of the desired item, whether they are a member of that library or not?



OpenWorldCat exposes information about the holdings of libraries that contribute their data to OCLC's WorldCat, making it visible to search engines such as Google.

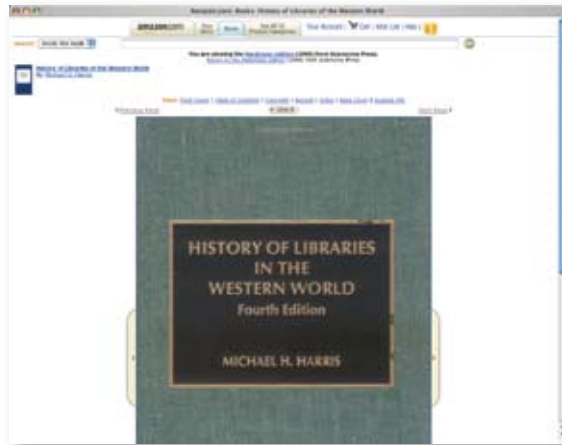
Libraries will seek participation

Library 2.0 facilitates and encourages a culture of participation, drawing upon the perspectives and contributions of library staff, technology partners and the wider community.

Blogs, wikis and RSS are often held up as exemplary manifestations of Web 2.0. A reader of a blog or a wiki is provided with tools to add a comment or even, in the case of the wiki, to edit the content. This is what we call the Read/Write web.

¹³ OpenWorldCat - <http://www.oclc.org/worldcat/open/>

Talis believes that Library 2.0 means harnessing this type of participation so that libraries can benefit from increasingly rich collaborative cataloguing efforts, such as including contributions from partner libraries as well as adding rich enhancements, such as book jackets or movie files, to records from publishers and others.



Library 2.0 is about encouraging and enabling a library's community of users to participate, contributing their own views on resources they have used and new ones to which they might wish access.



Ed Vielmetti, a user of Ann Arbor's District Library, took information from the library catalogue about new books to automatically generate images like this one.

http://vielmetti.typepad.com/superpatron/2005/12/visual_wall_of_.html

With Library 2.0, a library will continue to develop and deploy the rich descriptive standards of the domain, whilst embracing more participative approaches that encourage interaction with and the formation of communities of interest.



The National Library of Australia is working alongside the flickr photo-sharing site, making it easier to contribute images to the library's Picture Australia service.

So what are Talis doing about Library 2.0?

Library 2.0 is about small pieces of software loosely joined, which requires a horizontally integrated market with customer choice not vendor lock in, and it requires business models where multiple vendors bring value to consumers together. But more than anything else, the structure of the market requires costs to be factored out, to reduce duplication of effort and reduce the barriers to innovation; the industry requires a library domain platform.

The days of closed, proprietary, and monolithic library software systems are drawing to a close. So are the self-perpetuating business models that have generally led to a lack of substantial innovation.

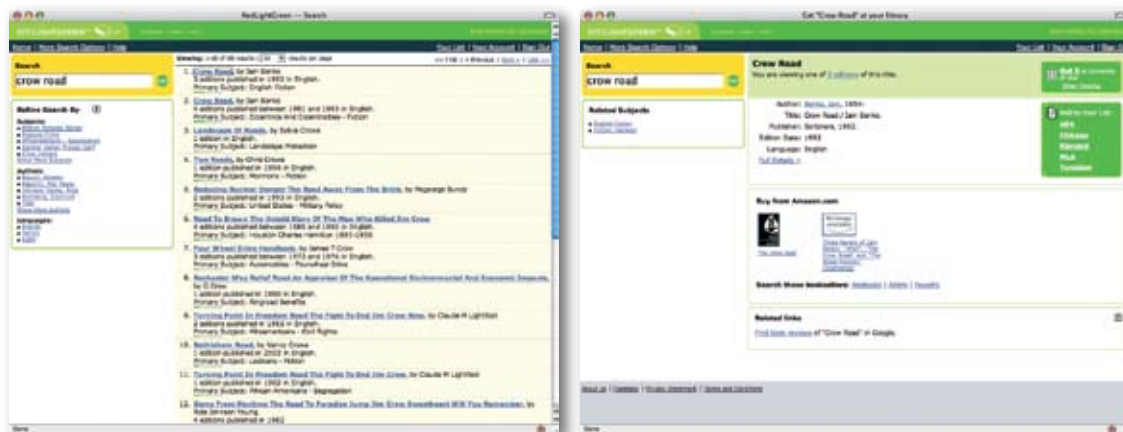
If we are to deliver upon the promise of Library 2.0, we need to specify and build modular systems from which libraries can select the best components for a given task but be assured that they will interoperate via common standards and protocols.

The Talis Library Platform

In 2005 Talis started creating a new software platform that embraces many of the attributes of Web 2.0 and Library 2.0 as discussed in this and previous papers. Being a true ‘platform’ it also hides the complexity of underlying components and enables and encourages a global community of users and developers to build numerous applications.

This Platform¹⁴ includes a set of subsystems that encapsulate the functionality needed to deliver next generation applications at a much lower cost using commodity components.

The Talis Directory (code named Silkworm) is one such subsystem. It is a directory of library collections currently including OPACs and Z targets, using an extensible metadata schema. As well as a human interface to maintain the directory entries, it is also available as a set of Web Services so that we – and those in the Talis Developer Community – can build applications. One early adopter is RLG, who simply use the directory Web Services API in their RedLightGreen application to enable deep links into the catalogues of its member libraries.



RedLightGreen leverages the power of RLGs massive union catalogue, and allows users to find books relevant to their search. Talis' Directory assists in providing reliable links deep into individual library catalogues.

Other subsystems exist to manage large scale distributed data stores (code named Bigfoot), and to provide a local application server to integrate multiple applications (code named Keystone). Bigfoot uses RDF based technology to embed semantics within data relationships and takes advantage of low cost commodity hardware and open source software to dramatically reduce the cost of managing large scale data sets. Keystone provides an application server using a Service Oriented Architecture that encapsulates and exposes the

¹⁴ For more information on the emerging Talis Platform, see <http://www.talis.com/platform/>

existing functionality of the incumbent library automation solution as a set of Web Services. Further subsystems address the needs of large scale data warehousing, transaction gateways, and optimised local indexing.

We have created a working prototype (code named Whisper¹⁵) that uses these subsystems and their Web Service interfaces. The prototype illustrates some of the ways in which holdings data from a logically defined set of libraries might be displayed and made useful, alongside comparator data from third parties such as Amazon or Google.



Talis' Whisper demonstrator illustrates one way in which a common set of web services might be combined in order to deliver a useful application.

The Talis Platform hides the complexity of managing metadata, of resource discovery and sharing, of transactions, of aggregating data across many systems, and of integrating best of breed applications into libraries. The platform is designed to lower the cost and technical barriers to use by the open source community to innovate on, and for institutional developers and our vendor peers to build upon.

In essence the platform wraps each library system in a layer of standards-based adaptors that make each library system look the same to applications that target the platform, both for data harvesting and integration. The platform can then link individual libraries together to create different resource sharing views, be those resources bibliographic, learning based or community based resources.

With the Talis library software platform it becomes possible to build a wide range of rich applications that draw upon other sets of library data, such as purchase trends, circulation trends, and more, in order to deliver added functionality as a result of connected nodes on the Talis Platform. All future versions of Talis' current applications will take advantage of the platform services.

¹⁵ See <http://research.talis.com/2005/whisper/>

Behind Talis' vision for the next generation of library services is the recognition that neither libraries nor library systems vendors are necessarily well placed to act wholly alone. If we are to deliver in ways that make the work of librarians easier, more fulfilling and more valuable, and if we are to reassure information consumers that libraries are – and will continue to be – a relevant part of their information seeking behaviour, then we need to work in partnership¹⁶, and deliver solutions upon which others can build with confidence.

Consequently, for Library 2.0 to become commonplace, libraries, technology providers, policy makers and information consumers must work together. We must all combine to debate the good and the bad in new innovations and the possibilities they lay before us. We need to collaborate to lower the barriers that prevent others from easily being able to build upon past work.

Common standards, shared approaches to challenging outdated principles and presumptions, a shared Platform of common data and services upon which to build, and a neutral space in which to gather, to explore, and to build. All of these are required if we are to move from an interesting set of concepts, illustrated by some exemplary applications, towards deployment in the mainstream, suitable for every library.

At a technical level, the idea of a set of network services capable of being combined and recombined in order to build new applications that offer far greater value than the combined values of individual applications will require more collaboration from libraries themselves. Building these services on top of a shared Platform¹⁷ will allow each of them to concentrate upon the detail of providing that which they were designed to do, and reduces the complexity of combining them in new ways.

Talis is currently building bridges with other vendors so that we can do just that. With our work on the Talis Platform, and with our Talis Additions and Talis Connexions partnership programmes we are making a contribution towards a more sustainable whole. With the Talis Developer Network, we offer a place in which all comers can usefully work together, learn from one another, and offer up a set of services and applications to truly meet the needs of libraries, librarians, and information consumers now and in the years ahead.

¹⁶ Through the Talis Developer Network (<http://www.talis.com/tdn/>), and the associated Additions (<http://www.talis.com/partners/additions/>) and Connexions (<http://www.talis.com/partners/connexions/>) activities, we are actively seeking to engage with a broad set of stakeholders.

¹⁷ For more information on Talis' vision of the Platform, see <http://www.talis.com/platform/>

Conclusion

As Talis' Ian Davis once wrote¹⁸, only to find his thoughts widely repeated, “Web 2.0 is an attitude, not a technology”. The same is true of Library 2.0. Technology merely offers us a means by which we can realise a set of goals shared across the library sector.

The sector as a whole needs to give serious consideration to the directions in which it wishes to move; to the ways in which it might seek to reap benefits from the effect of Amazon, Google, and their ilk.

Information services from others do not threaten responsive and adaptable libraries. They validate much that we have always done, and bring information to a far wider audience than we have managed. We can learn from much that they have achieved, and combine this knowledge with our unique skills and assets in order to deliver a truly compelling set of services.

Across all aspects of current library services there are questions to be asked. Does it make sense for data on holdings aggregated from across a number of libraries to be difficult for information consumers to locate or interact with? Do current notions of belonging to a single library or library authority make sense in an increasingly mobile world? Do current restrictions on access to electronic resources licensed by the library make sense, or should we push harder against the providers of those resources? Does the current model for procuring a complete library system offer value to the library or to its users? Does Open Source offer a better development model – even for incumbent software vendors?

The library sector needs to challenge the current presumptions about libraries, sweeping aside those that no longer make sense and determining if and how it makes sense to work around those that remain. That doesn't mean we will have to revise all aspects of library services, but we must now be prepared, collectively, to adapt to the changes in expectation and usage of information resources and technological changes sweeping our environment.

¹⁸ <http://internetalchemy.org/2005/07/talis-web-20-and-all-that>

How can I get involved?

We urge you to follow the links in this paper, to track the many informed conversations from some of those who are blazing trails in this area. Think about what you could do, or about what their innovations might mean in your library. To share your work, or to see the work of others, join the Talis Developer Network – it's free.

For more information, contact Paul Miller, Talis' Technology Evangelist, by email: paul.miller@talis.com or phone: +44 (0) 870 400 5000.



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