EMERGING TECHNOLOGIES AND THE FUTURE OF LIBRARIES (and library systems)

Emerging technologies and future of libraries: issues and challenges. January 30-31 2015 Gulbarga University, Karnataka State, India

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my focus…………

technology trends –in particular as they affect the directions of library related technology

Higher Education/academic libraries (in the main)

(my view is biased by my UK setting)

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# the point is to help work out what to *do*
so it's about *strategy*

'strategy...a **cohesive response** to an important challenge'

'Good Strategy/Bad Strategy: The difference and why it matters'. Richard Rumelt . Profile Books 2011

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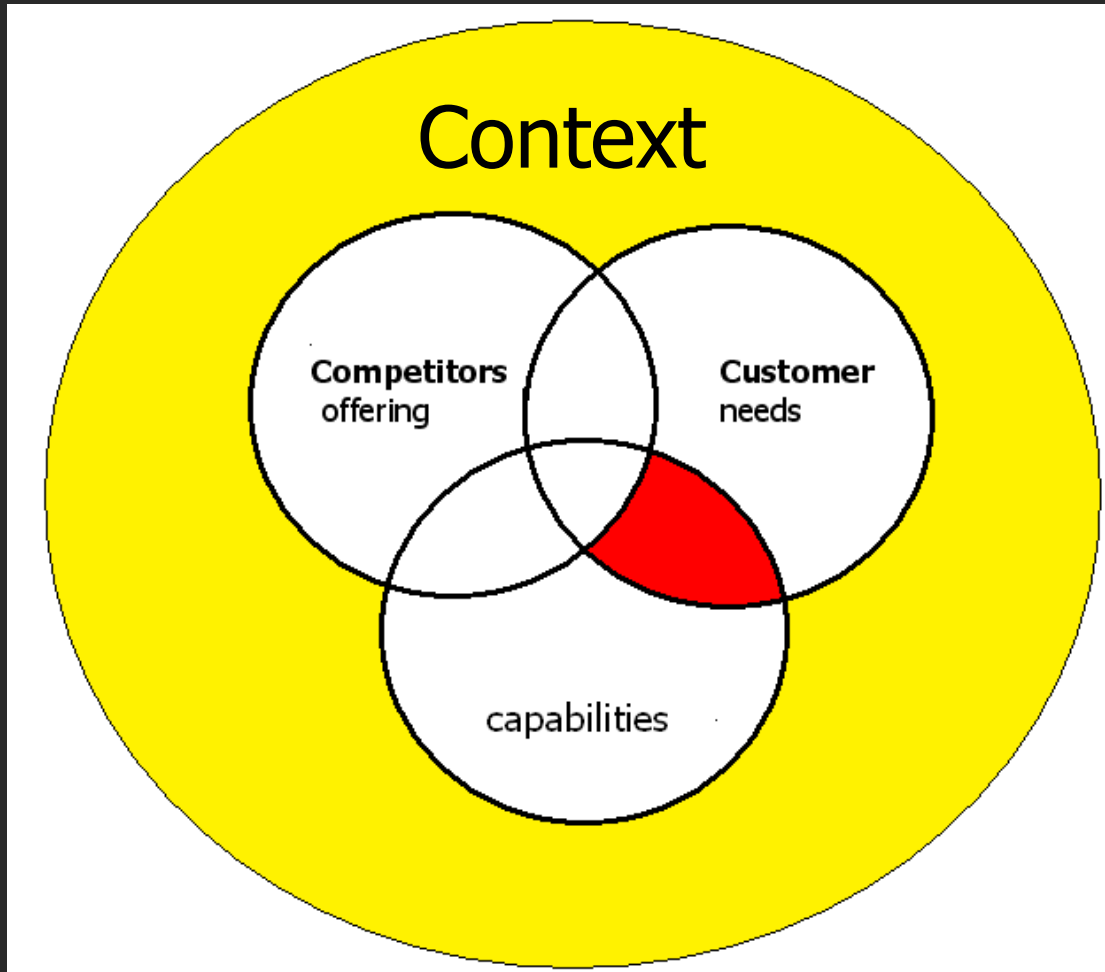
a framework for strategy
to get the best return focus your efforts on meeting those customer needs
that are *not* met by your competitors but *can* be met with *your* capabilities

strategic sweet spot

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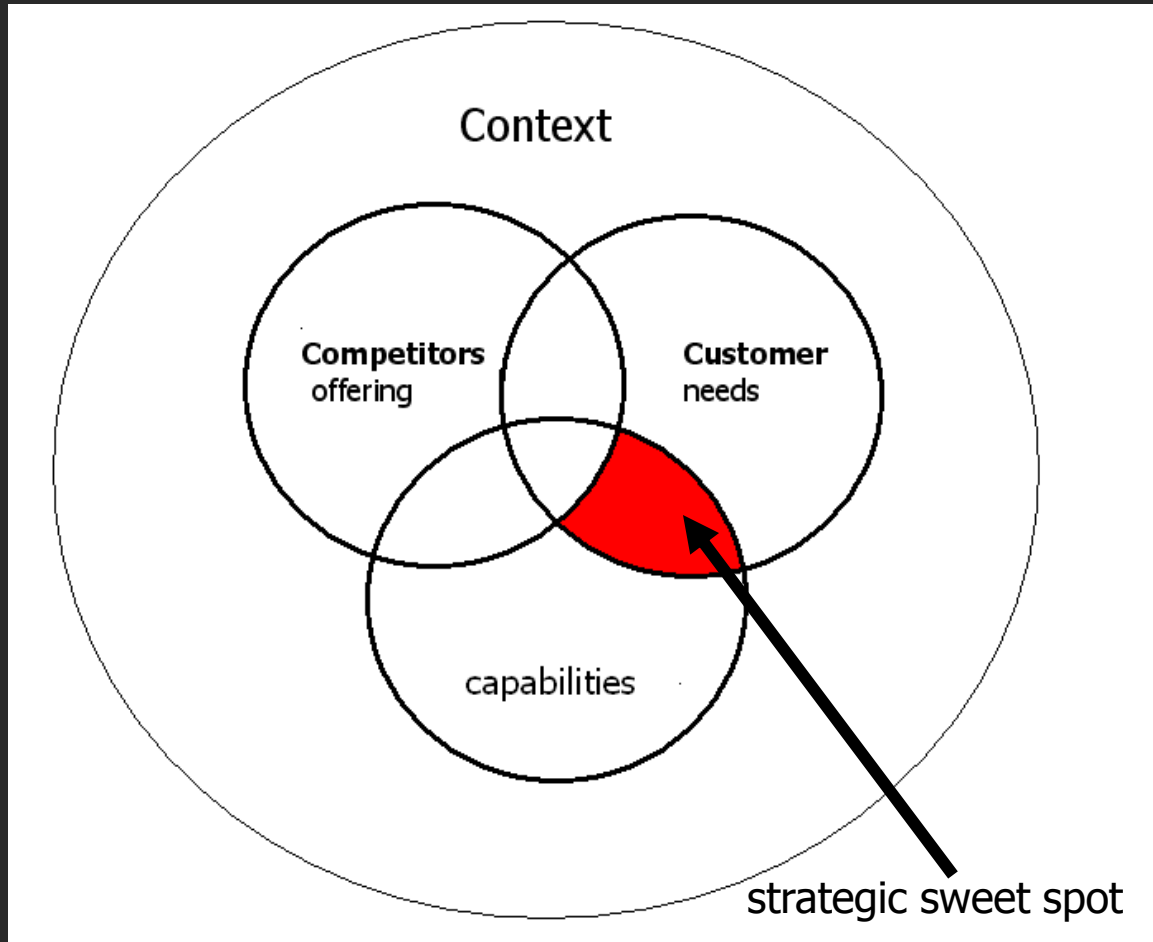
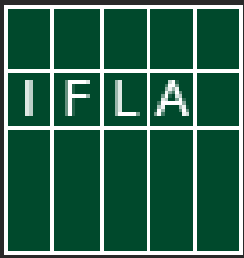'strategy…a **cohesive response** to an important challenge…'

what *is* the challenge?

context: what is going on?

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context....
global technology trends

New technologies will transform the global economy

It's clear that new technologies stand to profoundly equalize access to information around the world, not simply for developing countries but a range of social and economic groups. Technology enables young entrepreneurs to reach a global audience. New creation and distribution models stand to profoundly disrupt the existing information chain.
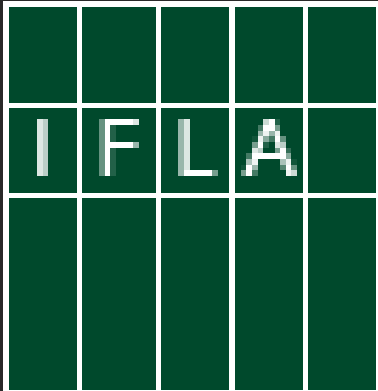
"In the next 5 years Western businesses will be competing with young African entrepreneurs who will successfully build the next batch of billion dollar companies."

Mariéme Jamme - CEO, Spot One Global Solutions

http://trends.ifla.org/insights-document
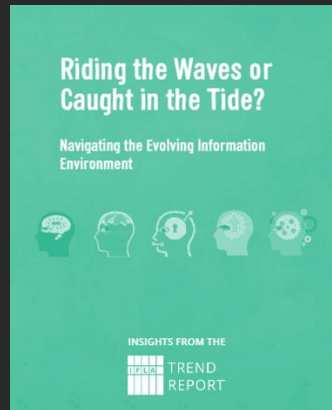
Riding the Waves or Caught in the Tide?

Navigating the Evolving Information Environment

INSIGHTS FROM THE
IFLA TREND REPORT

TREND 1	New Technologies will both expand and limit who has access to information.
TREND 2	Online Education will democratise and disrupt global learning.
TREND 3	The boundaries of privacy and data protection will be redefined..
TREND 4	Hyper-connected societies will listen to and empower new voices and groups.
TREND 5	The global information environment will be transformed by new technologies.

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top technology trends to watch: 2014 to 2016
http://www.forrester.com/Top+Technology+Trends+To+Watch+2014+To+2016/fulltext/-/E-RES104141

This year's top technology trends take a **customer-oriented, outside-in view of information technology** changes using the themes of engaged, smart, nimble, and secure.

…..strategists must understand these trends and how specific emerging technologies can be employed to position their firms ahead of the changes.

including libraries

Top Technology Trends To Watch: 2014 To 2016. By Brian Hopkins with Leslie Owens, John C. McCarthy, Abigail Komlenic. Forrester [blog] 4 November2013

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Digitalization and the digital business are catalysts of change that are affecting the human-machine relationship and driving better customer outcomes.

IT leaders should use Gartner's predictions as planning assumptions on which to base their strategic plans.

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Key Findings

Renovating the customer experience is a digital priority.

Some past themes
http://www.gartner.com/newsroom/id/2209615

Mobile Device Battles

Mobile Applications and HTML5

Personal Cloud

The Internet of Things

Hybrid IT and **Cloud** Computing

Strategic **Big Data**

Actionable **Analytics**

Integrated Ecosystems

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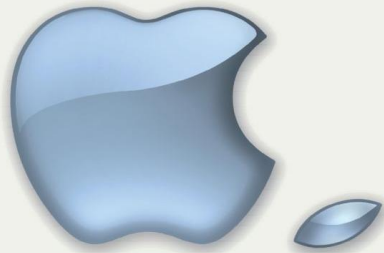
NewStatesman

Free thinking since 1913   22-28 November 2013/£3.50 www.newstatesman.com

iBroken

Why Apple is falling behind Google and Facebook

By Bryan Appleyard

"**The big picture is this.** There are three companies competing to be the internet platform of the future-Apple, Google and Facebook".

Is Apple dying? By Bryan Appleyard. New Statesman 22-28 November 2013
http://www.newstatesman.com/

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context
HE trends

NMC Horizon Report 2014 Higher Education Edition
http://www.nmc.org/publication/nmc-horizon-report-2014-higher-
education-edition/

Key Trends Accelerating Higher Education Technology Adoption

Fast Trends: Driving changes in higher education over the next one to two years
> **Growing Ubiquity of Social Media**
> **Integration of Online, Hybrid, and Collaborative Learning**

Mid-Range Trends: Driving changes in higher education within three to five years
> **Rise of Data-Driven Learning and Assessment**
> **Shift from Students as Consumers to Students as Creators**

Long-Range Trends: Driving changes in higher education in five or more years
> **Agile Approaches to Change**
> **Evolution of Online Learning**

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Higher Education Technology Trends

E-Textbooks: The trend is towards not so much e-books, as 'digital learning environments'

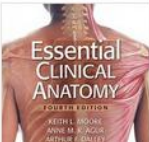# new approaches to textbooks

Inkling Builds a Better (and Pricier) E-Book By Danielle Kucera 12 February 2013

"Publishers will have direct access to consumers, they'll have access to data about how their content is performing, and they'll be able to monetize through the world's largest storefront, which we think is Google," says MacInnis.

A Google spokesman says: "Our goal with search is to make information accessible to people and help them get the answers they're looking for. It's always a good thing when there's more information out there."

Higher Education Technology Trends

Open Educational Resources: Higher education is further along in thinking about open education resources and the kinds of things that can be licensed for use and reuse.

NMC Horizon Project

Open is a key trend in future education and publication, **specifically in terms of open content, open educational resources, massively open online courses, and open access.** As "open" continues its diffusion as a buzzword in education, it is increasingly important to understand the definition. Often mistakenly equated only with "free," open education advocates are working towards a common vision that defines "open" as free, attributable, and without any barriers.

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the **idea of openness, in multiple ways, is having a profound effect on the landscape of information services and cultural provision** The Open Data movement has been influential in the unlocking of publicly-held information for analysis and re-use by researchers, businesses and the public. In academic research, the scientific community is working through the complex process of making research data discoverable and accessible.

Open Access to research publications has developed faster and more extensively than many envisaged, with growing volumes of publicly funded research made available openly on the web.

Living Knowledge: The British Library 2015 – 2023. 16 January 2015
http://www.bl.uk/projects/living-knowledge-the-british-library-2015-2023?
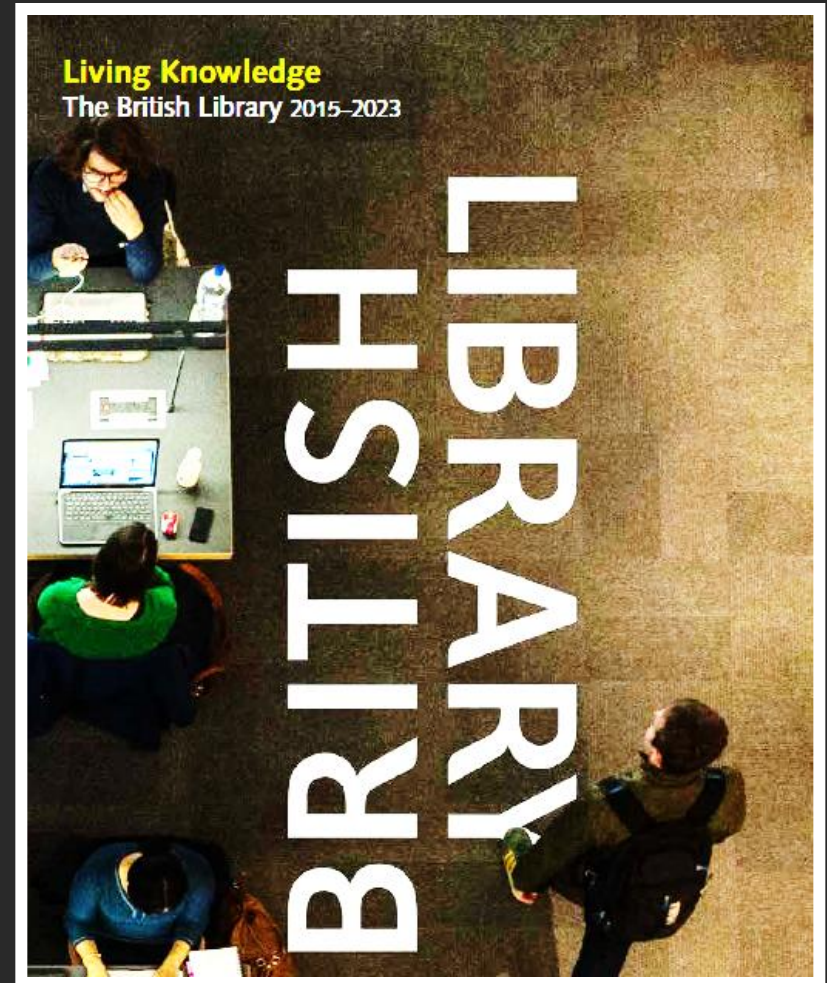
Universities signed up to offer courses on Futurelearn

University of Birmingham
University of Bristol
Cardiff University
University of East Anglia
University of Exeter
King's College, University of London
Lancaster University
University of Leeds
The Open University
University of Southampton
University of St Andrews
University of Warwick

Massively open online courses are proliferating. MOOCs have captured the imagination of senior administrators and trustees like few other educational innovations have.

MOOCs are increasingly seen as a very intriguing alternative to credit-based instruction. The prospect of a single course achieving enrollments in the tens of thousands is bringing serious conversations on topics like micro-credit to the highest levels of institutional leadership.

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Social media are changing the way people interact, present ideas and information, and judge the quality of content and contributions. Educators, students, alumni, and even the general public routinely use social media to share news about scientific and other developments. Likewise, scientists and researchers use social media to keep their communities informed of new developments. The fact that all of these various groups are using social media speaks to its effectiveness in engaging people. The impact of these changes in scholarly communication and on the credibility of information remains to be seen, but it is clear that social media has found significant traction in almost every education sector

There is an increasing interest in using data for personalizing the learning experience and for performance measures.

As learners participate in online activities, they leave a vast trace of data that can be mined for a range of purposes. In some instances, the data is used for intervention, enrichment, or extension of the learning experience. This can be made available to instructors and learners as dashboards so that student progress can be monitored. In other cases, the data is made available to appropriate audiences for measuring students' academic performance. As this field matures, the hope is that this information will be used to continually improve learning outcomes

but are universities responding adequately?

'universities are clinging to a medieval concept of education in an age of mass enrolment. In a recent book, "Reinventing Higher Education", Ben Wildavsky and his colleagues at the Kauffman Foundation, which focuses on entrepreneurship, add that **there has been a failure to innovate.'**

[Higher education] Not what it used to be. American universities represent declining value for money to their students. Economist 1st Dec 2012http://www.economist.com/news/united-states/21567373-american-universities-represent-declining-value-money-their-students-not-what-it

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how is Google responding?

‘The future of search.’ By Tom Vanderbilt
04 January 2013

http://www.wired.co.uk/magazine/archive/2013/01/features/the-future-of-search?page=all

'search has become embedded into everything'

In just a few years we have gone from search engines -- the name now sounds as archaic as the Victorian "difference engines" -- with their roots in the staid academic discipline of information retrieval, to, simply, "search"

Search has become embedded into everything, and has reached well beyond its web-based roots."

meaning

Google does the work and understands what you want. "As a scientist I can say 'understand' is a poorly understood concept," says Singhal. "Even how you and I understand something is not well understood."

understanding & meaning & context

"One of the things we're trying to do is first to catalogue everything in the world you might want to know about," he says.

"We're also trying to marry that with the knowledge that the search engine already has about what people are actually looking for."

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understanding entities- 'things not strings'

when the user searches for "Michael Bloomberg", Google is not looking for the web pages that contain that string of letters, but for the entity known as Michael Bloomberg. "With the Knowledge Graph," says Singhal, "Google has become smarter. " Things, not strings, as Google likes to say.

Google page showing the 'entity' describing Michael Bloomberg

the 'knowledge graph'

With the Knowledge Graph, Google has taken a different step towards the future of search: **providing answers, not links. This raises the question of authority,** long on the mind of Google engineers.

_____

(and of course the authority of information is a key issue for librarians)

WIRED
Google's
NEXT PLAN
The future of search
WIRED
Issue 01.13

these are the pillars of Google's future of search

1 the vast knowledge of user behaviour and intent it already has and is compiling every second;

2 the Knowledge Graph, in which strings become things

3 Google's advances in artificial intelligence.

context

so what does all this mean for the library and library technology?

value of the industry (with a US bias)

US & Global

Marshall Breeding's annual review: "For the 2012 ..the library technology economy, including the total domestic and international revenues of all the companies with a significant presence in the United States or Canada, at **$770 million**, an increase of just under three per cent relative to last year's estimate of $750 million.

estimate aggregate revenues of around **$1.8 billion**, which would also include radio-frequency identification (RFID) and other self-service products in addition to the technologies related to library management and resource discovery."

(Automation Marketplace 2013: The Rush to Innovate. By Marshall Breeding, Digitalshift [library Journal] 2 April 2, 2013 http://www.thedigitalshift.com/2013/04/ils/automation-marketplace-2013-the-rush-to-innovate)

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the revenues of Google alone exceed the aggregate revenues of the global library technology market by
50 X

library services have to *compete* for attention

"libraries are so valuable that they attract voracious new competition with every technological advance"

LIBRARY JOURNAL

Libraries, ebooks and competition. Eric Hellman Library Journal August 2010 p 22-23

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.....organize the world's information and make it universally accessible and useful

'We're good now at cataloguing and indexing stuff.'
Eric Schmidt, Google CEO

'Inside Google. The Man with all the answers'.
By David Rowan. Wired [UK edition] August 2009

Isn't this what libraries do? So does that make Google a library ?

the 'library' business is booming

LIBRARYJOURNAL

Start-Ups Take Library Jobs | Reinventing Libraries

By Eric Hellman on ▦ September 4, 2013 ⬚ 9 Comments

Three years ago, I wrote here that "libraries are so valuable that they attract voracious new competition with every technological advance" (see "Libraries, Ebooks, and Competition," *LJ* 8/10, p. 22–23). At the time, I was thinking about Google, Apple, Amazon, and Wikipedia as the gluttonous innovators aiming to be hired for the jobs that libraries had been doing. I imagined Facebook and Twitter to be the sort of competitors most likely to be attracted by the flame of library value. But it's the new guys that surprise you. To review the last three years of change in the library world, I'd like to focus on some of the start-ups that have newly occupied digital niches in the reading ecosystem. It's these competitors that libraries will need to understand and integrate with to remain relevant. In order of maturity, from already exploded to just emerging:

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A commercial ebook library service …………co-founded by online gaming veteran Suren Markosian and former YouTube exec Kevin Donahue,

http://www.getepic.com/

Epic! opens the doors to a new world of reading for kids 12 and under by providing an unlimited selection of eBooks that can be instantly discovered, read and shared with friends.
Personalized for each individual reader, Epic! is the only place to access thousands of **high quality, curated children's books**

how can the (conventional) library domain respond to these trends?

Organizing content to support research and learning is at the heart of the library's institutional role.

A growing collection of technologies and tools can be used to more granularly organize, customize, and personalize the online information environment to fit professional, learning, and research activities.

'What Technology? Reflections on Evolving Services'. By Sharon Collins (EDUCAUSE Review online). October 30, 2009 http://www.educause.edu/ero/article/what-technology-reflections-evolving-services

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The challenge for library systems

it's a tough challenge: **(Marshall Breeding)**

"systems aren't as integrated or comprehensive anymore as **it takes maybe eight or nine or ten different applications ... to do the things that libraries do**."

'Current and future trends in information technologies for information units'. By Breeding, Marshall. El profesional de la información, 2011, v. 21, n. 1, pp. 9-15. http://www.elprofesionaldelainformacion.com/breeding-english.pdf

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library services platforms

'The emergence of a new genre of library services platforms that comprehensively manage library resources across all formats, based on service-oriented architecture with web-based interfaces designed for deployment through SaaS, stands to **reshape the industry over the next decade. This transition, however, remains in its early phase**'

'Automation Marketplace 2013: The Rush to Innovate' By Marshall Breeding. Library Journal 2 April 2013
http://www.thedigitalshift.com/2013/04/ils/automation-marketplace-2013-the-rush-to-innovate/

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'sometimes you just have to start over'

'**the amount of change we've seen, both in computer technology and in library management/operations,** is so substantial that the best way to accommodate the change is to start with a fresh design that can take advantage of all of these changes.

'The Future of Library Systems: Library Services Platforms'. By Carl Grant. NISO. Information Standards Quarterly. Fall 2012. Vol 24 Issue 4 ISSN 1041-0031
http://www.niso.org/apps/group_public/download.php/9922/FE_Grant_Future_Library_Systems_%20isqv24no4.pdf

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Make the library experience more engaging for users ------------"gamification" is one approach

Walsh, Andrew (2011) Gamifying the University Library. In: Online Information Conference 2011, 29th November - 1st December 2011 http://eprints.hud.ac.uk/11938/

"...a fully featured online gamification of library activities, including awarding points and badges for borrowing and returning items, leaving reviews, entering the library, and using online resources."

library centric discovery services

the challenge for library centric discovery services

'A casual Google search may well be good enough for a daily task. But if you are a college student conducting his or her first search for peer-reviewed content, or an established scholar taking up a new line of inquiry, then the stakes are a lot higher. The challenge for academic libraries, caught in the seismic shift from print to electronic resources, is to offer an experience that has the simplicity of Google—which users expect—while searching the library's rich digital and print collections—which users need.'

'The Next Generation of Discovery The stage is set for a simpler search for users, but choosing a product is much more complex.' By Judy Luther & Maureen C. Kelly Library Journal. 15th March 2011.
http://www.libraryjournal.com/lj/ljinprintcurrentissue/889250-403/the_next_generation_of_discovery.html.csp

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the challenge for library centric discovery services

While we may settle for sufficient and convenient resources in our everyday lives, precision (just relevant documents) and recall (all relevant documents) are vital for scholarly information.

'The Next Generation of Discovery The stage is set for a simpler search for users, but choosing a product is much more complex.' By Judy Luther & Maureen C. Kelly Library Journal. 15th March 2011. http://www.libraryjournal.com/lj/ljinprintcurrentissue/889250-403/the_next_generation_of_discovery.html.csp

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Now: discovery happens elsewhere

Then: discovery happens in the library

University Library
Partner in Science

Thinking the unthinkable – doing away with the library catalogue

Universiteit Utrecht

UKSG Webinar, June 2014
Simone Kortekaas

User survey

group interviews with students & scholars

One search engine to find everything...

For me, that's Google Scholar!

Universiteit Utrecht — **Universiteitsbibliotheek**
Partner in Science

"University libraries have lost their role in discovery....they had better focus on delivery"

'Thinking the unthinkable - doing away with the library catalogue' By Simone Kortekaas Utrecht University. Plenary presentation at the 2014 UKSG conference (s.kortekaas@uu.nl @simonekortekaas)

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library resource management

Managing resources to improve learning outcomes

Information for: Students | Business | Researchers | Former students | Staff

University of Huddersfield **Repository**

You are here: Uni home page » Research and Enterprise » Repository

Home
About
Help
Search
Browse

**Digging deeper into library data:
Understanding how library usage and other
factors affect student outcomes**

The original Library Impact Data Project (LIDP) found **a statistically significant relationship across a number of universities between library activity data (specifically the number of items borrowed and logins to e-resources in the library) and student attainment.**

http://eprints.hud.ac.uk/12973/

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the challenge –library metadata

DEUTSCHE NATIONAL BIBLIOTHEK

"As a result of the increasing level of digital interconnection in the information world, the **established formats used by libraries for exchanging data are no longer deemed fit for purpose**"

http://www.dnb.de/EN/Wir/Projekte/Laufend/bibframe.html

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'Bibframe' .....farewell to the MARC record

"Bibliographic Framework as a Web of Data: Linked Data Model and Supporting Services"

the future of bibliographic description that is fully web-enabled. "It is designed to integrate with," the report states, " and engage in the wider information community while also serving the very specific needs of its maintenance community — libraries and similar memory organizations.

Library of Congress' BIBFRAME Initiative: Part 1. By Roy Tennant. The Digitalshift (Library Journal) 12 December 2012 . http://www.thedigitalshift.com/2012/12/roy-tennant-digital-libraries/library-of-congress-bibframe-initiative-part-1/

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linked data

"Potential benefits of publishing library catalogues as open linked data

It is obvious that publishing the catalogues of major libraries as open linked data will permit their use in ways that will never be possible as long as they are kept in-house as MARC records.

Libraries and linked data #6: Why publish library catalogues as open linked data? Semantic Publishing. 1st March 2013
http://semanticpublishing.wordpress.com/2013/03/01/lld6-catalogues-and-linked-data/

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OCLC® The world's libraries. Connected.™

"Schema.org introduces an important new standard," said Richard Wallis, OCLC Technology Evangelist. **"Making library information compatible with the rich data sources now being published widely on the Web will establish libraries as a major hub in the linked data universe......"**

The Schema.org initiative —launched in 2011 by Google, Bing and Yahoo! and later joined by Yandex—provides a core vocabulary for markup that helps search engines and other Web crawlers more directly make use of the underlying data that powers many online services.

http://www.oclc.org/news/releases/2012/201238.en.html

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it's time for a new approach

"It requires a shift from bureaucracy to enterprise, an adaptive organization that reviews and reshapes what it does in light of changing requirements"
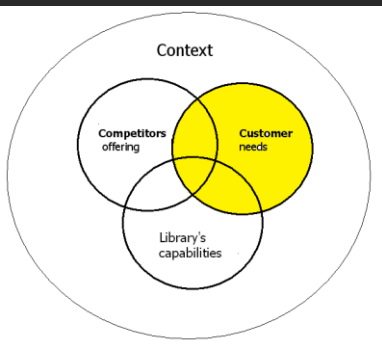
"This may need reorganization, new staff skills, changing priorities, reallocation of staff and resources, and so on."

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so how and where should we start to make changes?

start with the user
"By 2017, 50% of consumer product investments will be redirected to customer experience innovations."

"The customer experience may be the most impactful area of innovation available to businesses today. With the rapid rise of personal digital technology, customers have become savvier and more demanding about how they want to interact through technology. No longer can a business assume that the experience it has with its customers is good enough, or that it will not need to change in a short time. So, surprising innovations are beginning to arise"

Context

Competitors offering

Customer needs

Library's capabilities

Gartner.

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what do users *really* want?

"people don't want quarter-inch drills, they want quarter-inch holes."

Theodore Levitt of the Harvard Business School

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people 'hire' (with money, time effort) products and services to accomplish a task, **achieve a goal or solve a problem.**

these are the "jobs-to-be-done" (JTBD)

Jobs-to-be-done (JTBD) – the key elements

What is the *job* -problem that needs to be solved?

Who needs to get the job done/solve the problem?

What is the particular *circumstance* of the problem?

Gains/Outcomes-what (measurable) criteria does the user consider in order to decide if the job has been successfully accomplished?

Pain points and barriers to getting the job done

http://www.kenchadconsulting.com/how-we-can-help/innovation/

from function thinking to job thinking - asking 'why'

Process (each process may help get several jobs done)	WHY	some possible JTBD
search for an journal article	WHY	complete an assignment
find a book on the shelves	WHY	present a project
download an ebook	WHY	get a good degree
manage research data	WHY	improve my research reputation
(cataloguer) add/edit metadata	WHY	make the resource more discoverable

as well as looking at the jobs users needs to get done, this methodology is designed to test (or create) potential solutions …

it can be used as an evaluation tool to review existing or as a step in the process to design/create new solutions

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in the end of course it's about *value*

how well do the solutions you offer get user 'jobs' done?

solutions-the products and services you offer users

how do they meet outcomes (create gains) and overcome barriers (relieve pains)

Think about the products and services that you have already, or ones you can imagine, that might help your customers get their jobs done
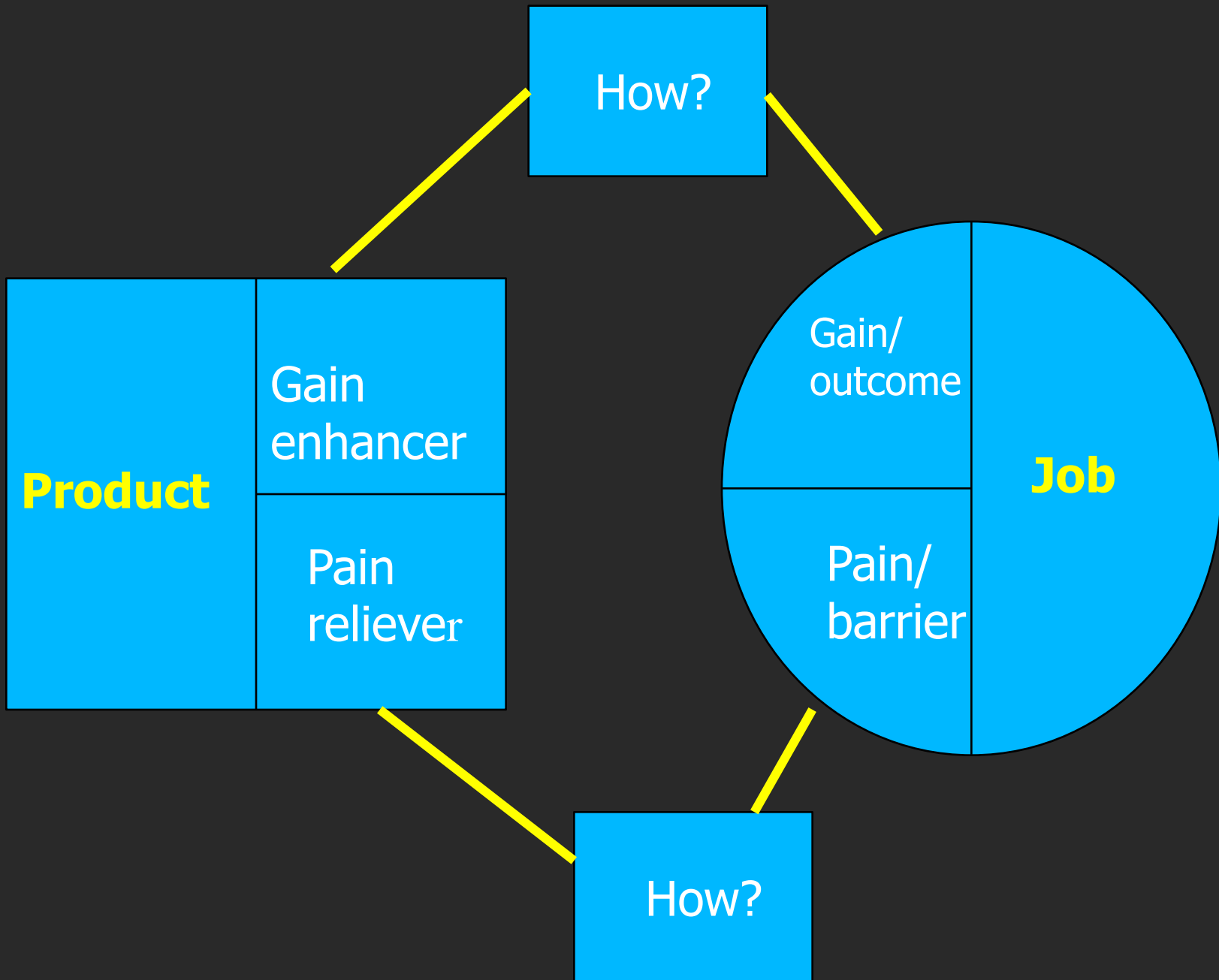
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analysing (potential) solutions
-focus on the following....

what outcomes can it address? ('gain creators')

what barriers does it overcome? ('pain relievers')

for what *jobs* is the solution applicable?

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How?

Product | Gain enhancer / Pain reliever

Gain/ outcome / Pain/ barrier **Job**

How?

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"The best way to predict the future is to invent it." Alan Kay

Quoted in "The Everything Book: reading in the age of Amazon"
By Casey Newton The Verge December 2014
http://www.theverge.com/2014/12/17/7396525/amazon-kindle-design-lab-audible-hachette

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International conference, emerging technologies and future of libraries: issues and challenges. January 30-31 2015 Gulbarga University, Karnataka State, India

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