

Building a Linked Data Graph for Education

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SemTechBiz, London, September 2012

What do we mean by an 'Education Graph'?

The set of **all (connected) entities** that have
an **active or potential bearing on**
the **education process**

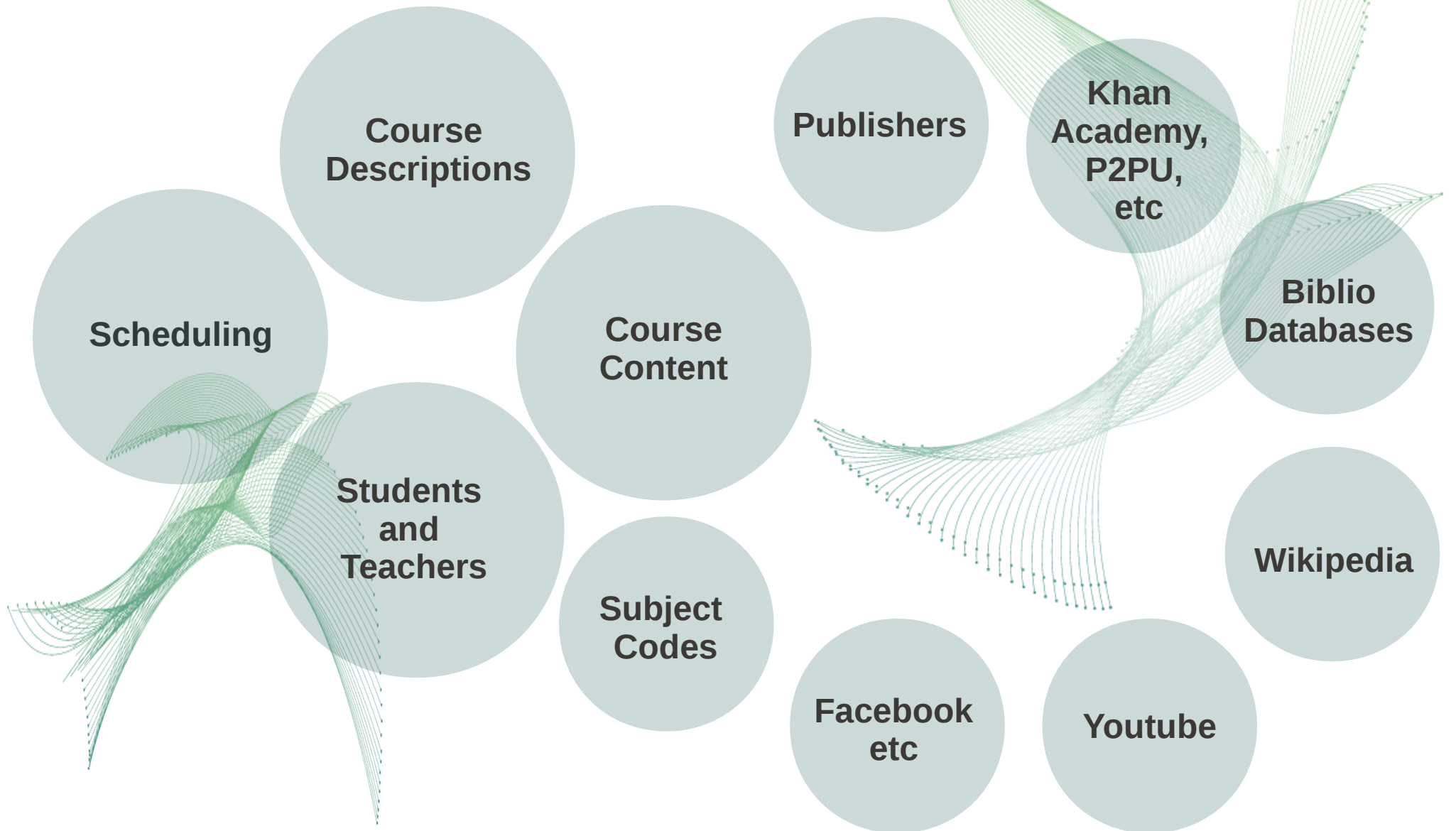
(initially focused on higher education)

Why do we care about an 'Education Graph'?

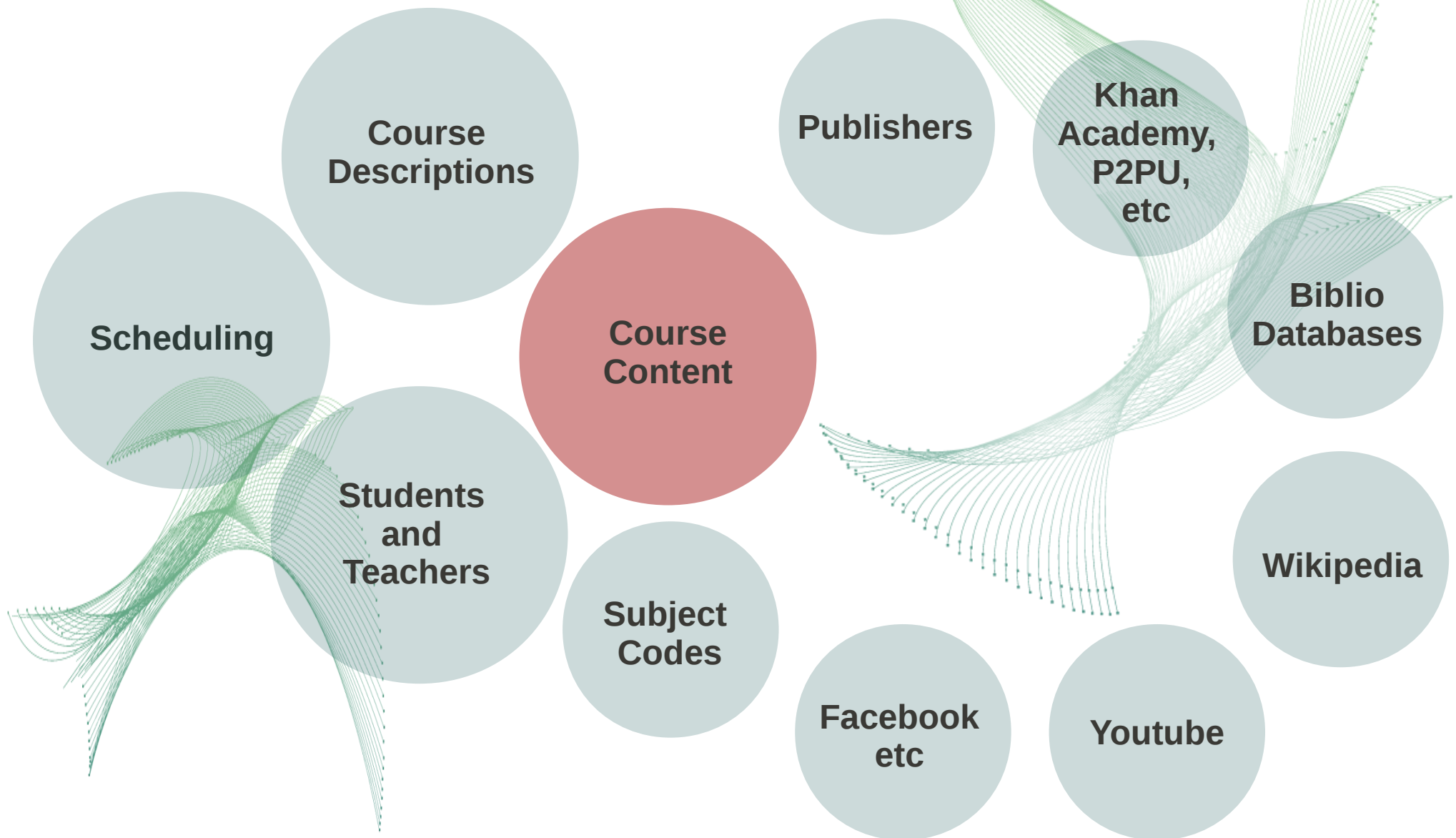
Because learning is artificially disconnected

An education graph can bridge those disconnects

Components of the Education Graph



Components of the Education Graph



Talis Aspire Reading Lists



BROADMINSTER
UNIVERSITY

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Business to Business Marketing (2011/12)



Ian Corns
a librarian

[Recent changes](#) | [Export to CSV](#) | [Export citations](#)

Linked to: [B2BMAR1](#), [B2BMAR](#)

Created: 7 months ago

Last updated: 3 days ago

Table of contents [\[show\]](#)

60 items

Group by: [Section](#) | [Type](#)

Introduction (4 items)

[Should entrepreneurs plan or just storm the castle? A meta-analysis on contextual factors impacting the business planning–performance relationship in small firms](#) - Jan Brinckmann, Dietmar Grichnik, Diana Kapsa, 2010-1
Article

Course Handbook (B2BMAR)

Course aims NOTE: This page was created using actual content from the following sources: Manchester Business School, Management Marketing - Overview, and About the course. It was created using the 'copy/paste from word' functionality to instantly add the... [click to read more](#)

[Marketing management](#) - Kotler, Philip, c2003 [i.e. 2002]
Book

Disclaimer: The resources selected in this demo list were influenced by '[BMAN70152 - Business to Business Marketing - Judy Zolkiewski](#)' from The University of Manchester. Some amendments have been made, to indicate the various ways academics approach organising a resource list (e.g. by importance, by format, by time, by topic).

Case Studies (4 items)

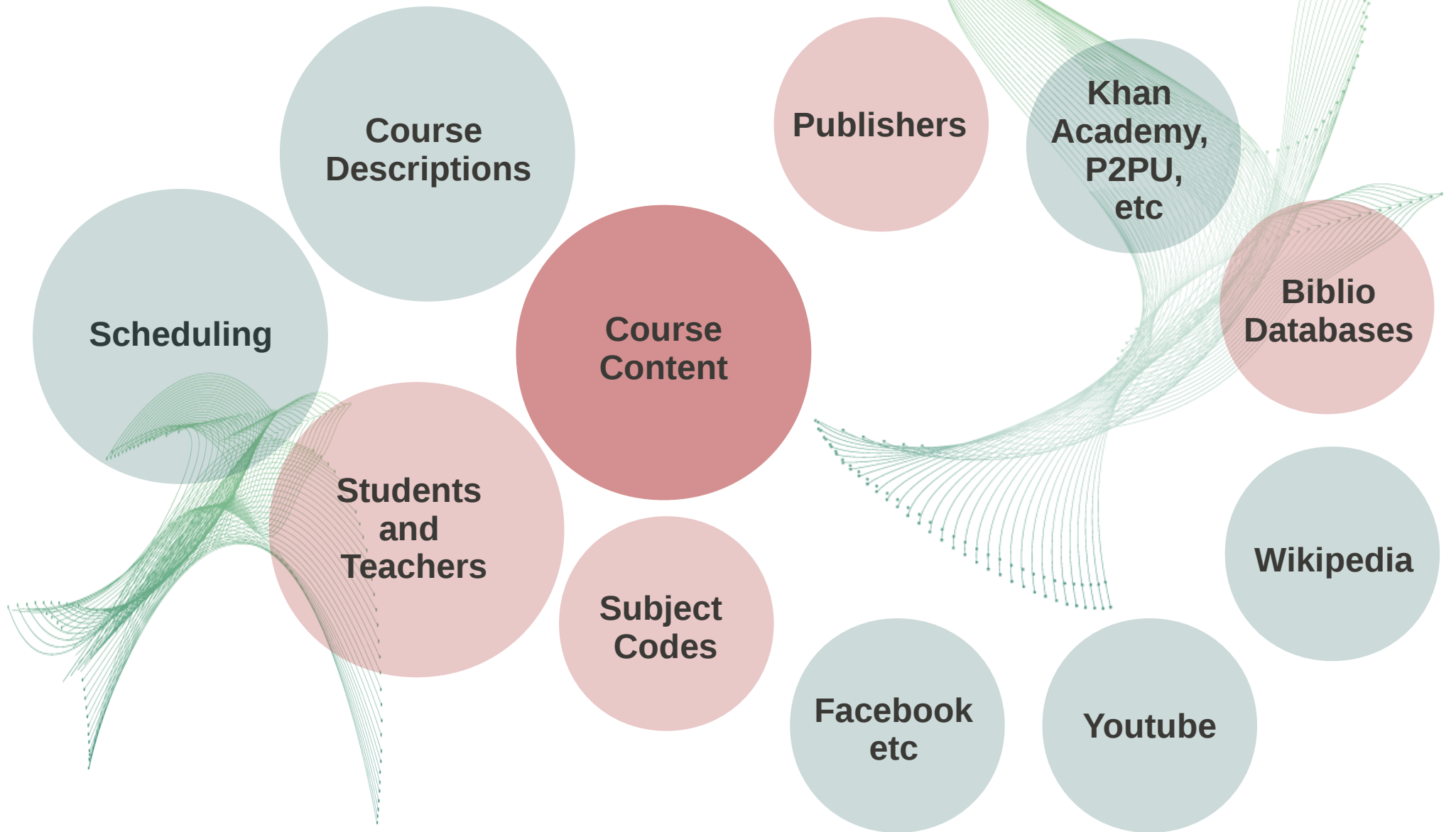
Talis Aspire Reading Lists

- >40 enterprise customers in the UK and beyond
- = 1/3 UK universities
- 10,000s of reading lists
- 100,000s of learning resources
- Heavy usage with interesting peaks in demand

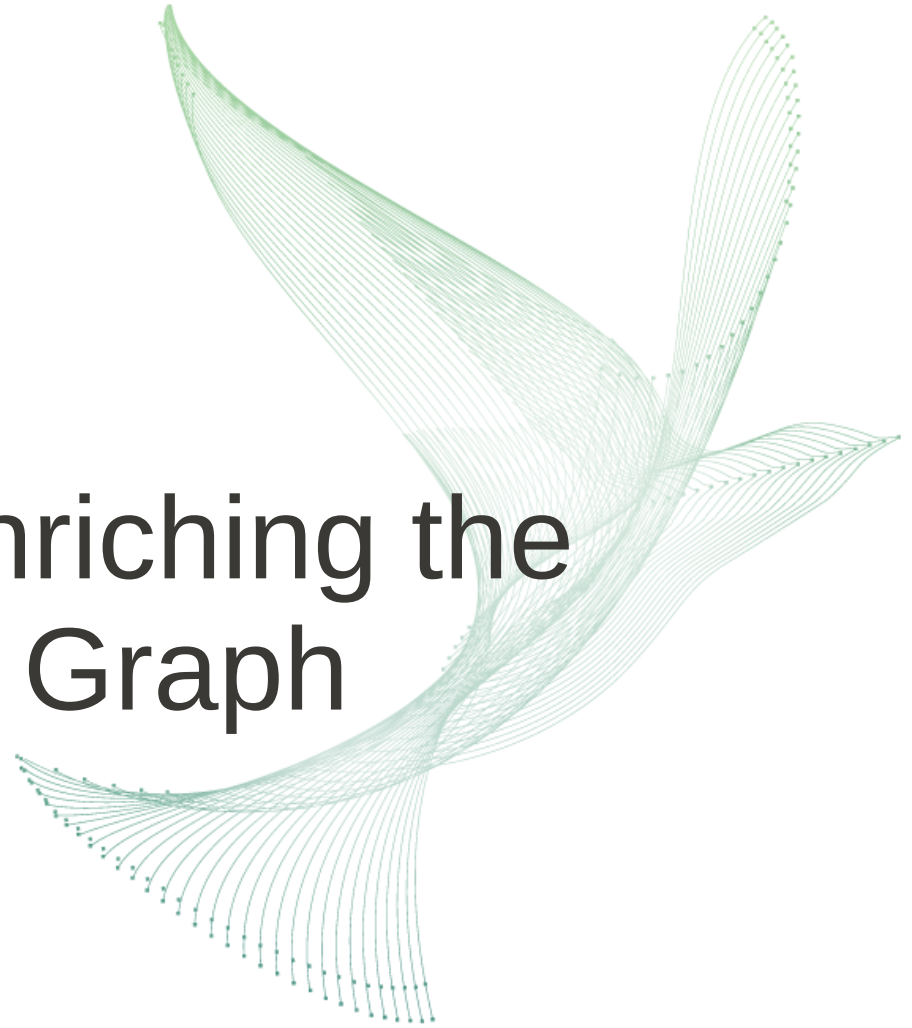
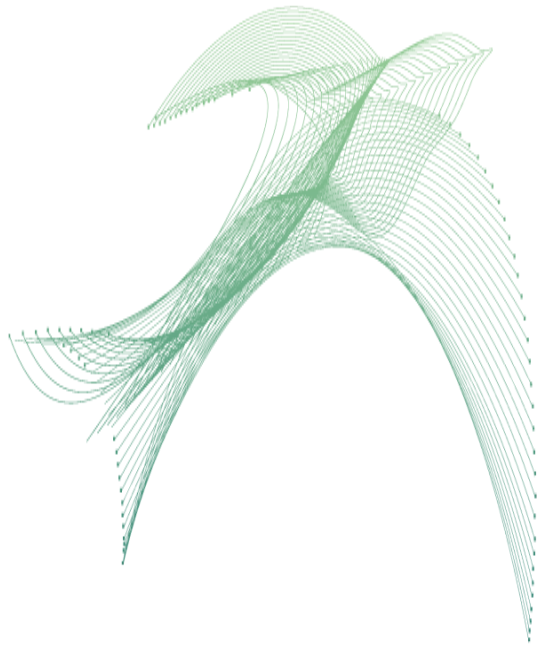
Talis Aspire Reading Lists

- An RDF-native application, hosted by us
- Backed by a hosted triplestore
 - Migrating to MongoDB
- Linked Data views available on the public Web
- A real, live Linked Data application with paying customers
- (Probably) the most heavily used Linked Data application in the education domain

Components of the Education Graph



Building and Enriching the Education Graph



From Plain Text to a 'Biblio-graph-ic' Record

- Problem
 - Only some data is entered in structured form
 - Legacy data is typically plain text citations
- Our Approach
 - Pre-process citation text with regex
 - Pass through heavily modified version of *FreeCite*
 - Clean output again with regex
 - Return as JSON object
 - Pass through entity reconciliation process...

Enhancing Data Quality with Entity Reconciliation

- **Validate the accuracy of the record by matching against high-quality reference data sources**
 - OpenLibrary, OpenKB (serials/journals), CrossRef
- **Books:**
 - match on a precise edition, roll up to work, map to our canonical resource
- **Articles:**
 - enrich the graph describing the resource using OpenKB, search CrossRef using enriched description, map to our canonical resource

Unifying the Institutional Sub-Graphs

- Goal

- Create a cross-institution (portion of) the education graph, centred around learning resources

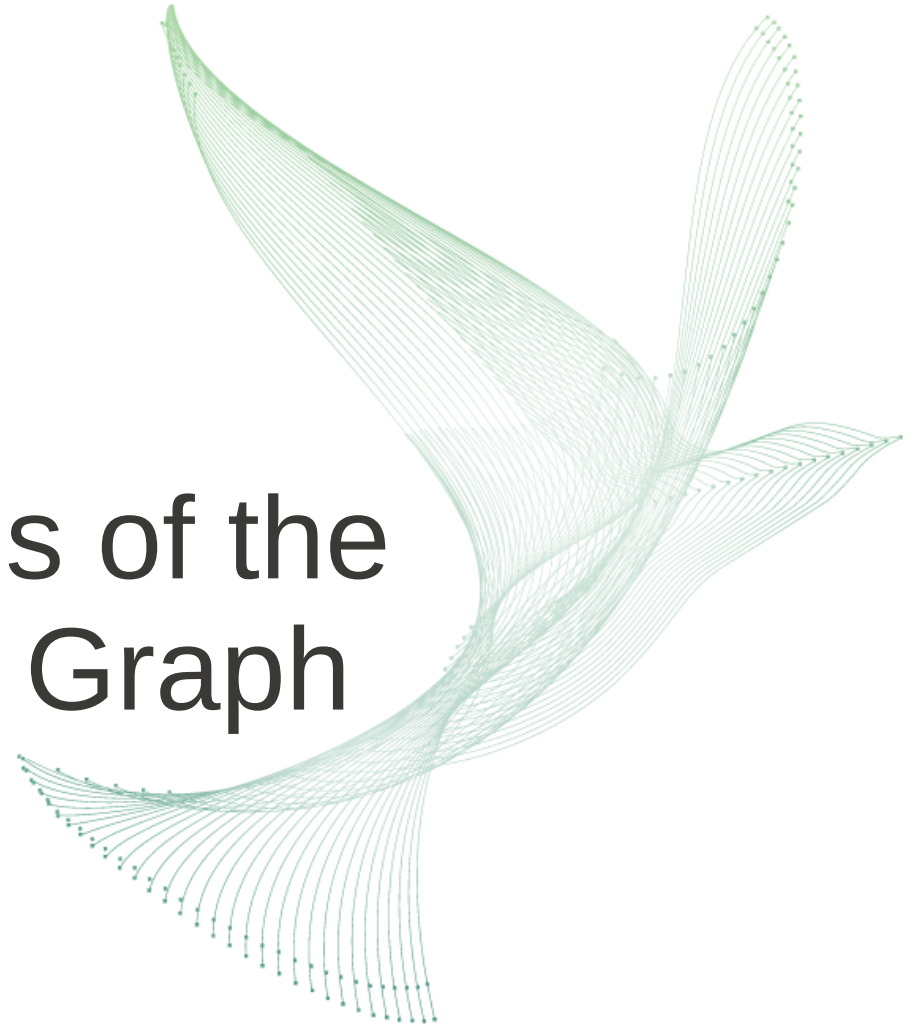
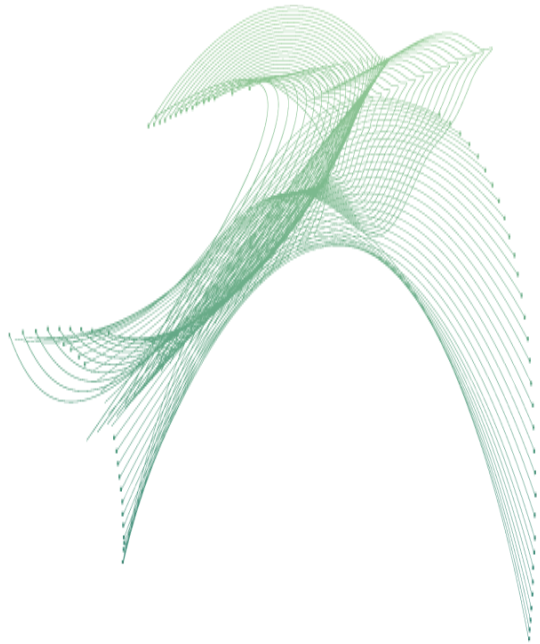
- Process

- Harvest the data from each Reading List store
- Repeat the entity reconciliation process
 - Retain the links mapping canonical resources to institutional data

Warehousing the Education Graph

- Goal
 - a single point of access to the education graph
- Applications
 - analytics and business intelligence (for us and customers)
 - data science experiments
- Approach
 - based on Apache Jena TDB/Fuseki + MongoDB

Applications of the Education Graph



Directory of Quality Learning Resources

Home

Disciplines ▾

For institutions

Sign In Register



Community Edition BETA

Find resources used to teach...

Go

High quality learning resources, selected by experts

363,482 learning resources, used to teach 22,473 university courses.

Search

Search hundreds of thousands of resources used to teach in UK institutions.

Bookmark

Bookmark resources for quick access later or directly to your course resource list.

Follow

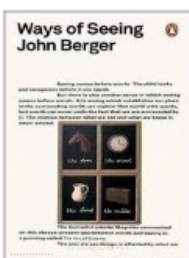
Follow your preferred disciplines/topics and stay informed about the latest resources used to teach in UK universities.

Feedback

Most referenced in Arts



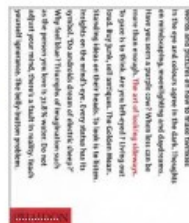
Book: 69 courses



Book: 49 courses



Website: 38 courses



Book: 38 courses



Browse courses at

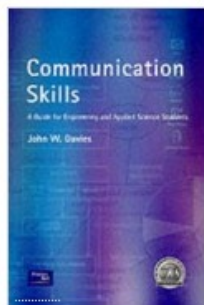


TM

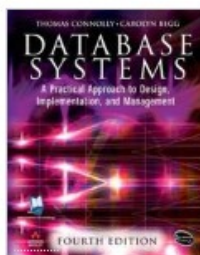
Most referenced in **Computer Science** ▾



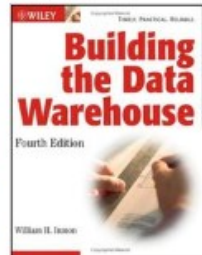
Book: 17 courses



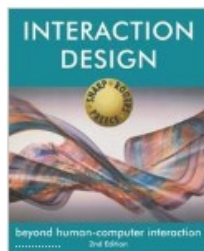
Book: 21 courses



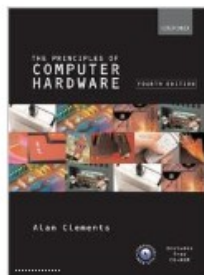
Book: 17 courses



Book: 7 courses



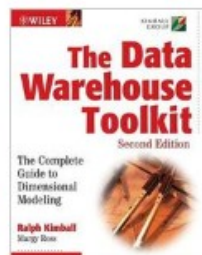
Book: 9 courses



Book: 9 courses



Book: 10 courses



Book: 6 courses

Browse courses at



Browse all disciplines

[Arts \(19,193\)](#)

[Chemistry \(382\)](#)

[Health and Medicine \(8,657\)](#)

[Languages \(22,178\)](#)

[Mathematics \(369\)](#)

[Social Science \(36,403\)](#)

[Biology \(1,480\)](#)

[Computer Science \(891\)](#)

[History \(16,623\)](#)

[Law \(7,359\)](#)

[Other Sciences \(8,200\)](#)

[Teaching and Education \(9,017\)](#)

[Business \(14,121\)](#)

[Engineering \(1,555\)](#)

[Humanities \(3,291\)](#)

[Literature \(9,781\)](#)

[Physics \(501\)](#)

Feedback

Recommending Learning Resources

Book by Roland Barthes








Image-Music-Text

Fontana Press (September 13, 1993) see more details...

Topics

addresses, essays, lectures criticism discourse analysis film criticism french language literary analysis
literary studies: general literature music music philosophy and aesthetics performing arts philosophy and aesthetics
philosophy of language semiotics semiotics addresses, essays, lectures semiotics structuralism
semiotics structuralism essays structuralism

Cited on these courses

-  Course at The University of Sussex
English PGCE and GTP - Autumn/Spring/Summer 10/11 - Jacqui Shepherd
Cites 537 resources
-  Course at The University of Sussex
Shakespeare's plays and Elizabethan theatre - is066a - Summer 2010 - Rafe Hallett
Cites 49 resources
-  Course at The University of Sussex
Special Author: Salman Rushdie
Cites 48 resources
-  Course at The University of Sussex
Aspects of France - R9012 - Micheline Maupoint (Spring/Summer 11/12)
Cites 6 resources
Disciplines: Languages
-  Course at Keele University
Understanding Culture (2011/12)
Cites 95 resources
Disciplines: Arts
-  Course at Keele University
Approaches to Film (2011/12)
Cites 37 resources
Disciplines: Literature
-  Course at Keele University
Reading Film (2011/12)
Cites 37 resources
Disciplines: Literature



★ Bookmark

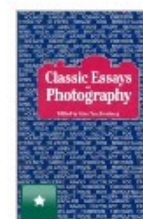
This resource often appears with



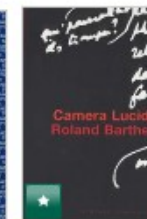
Book: 49 courses



Book: 23 courses

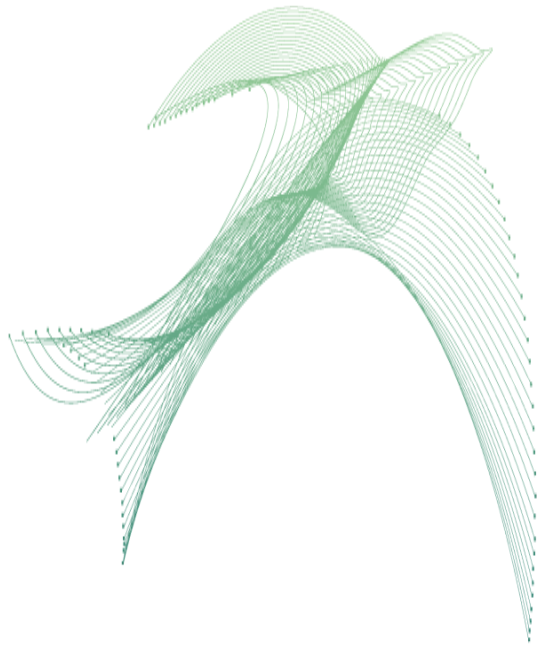


Book: 10 courses



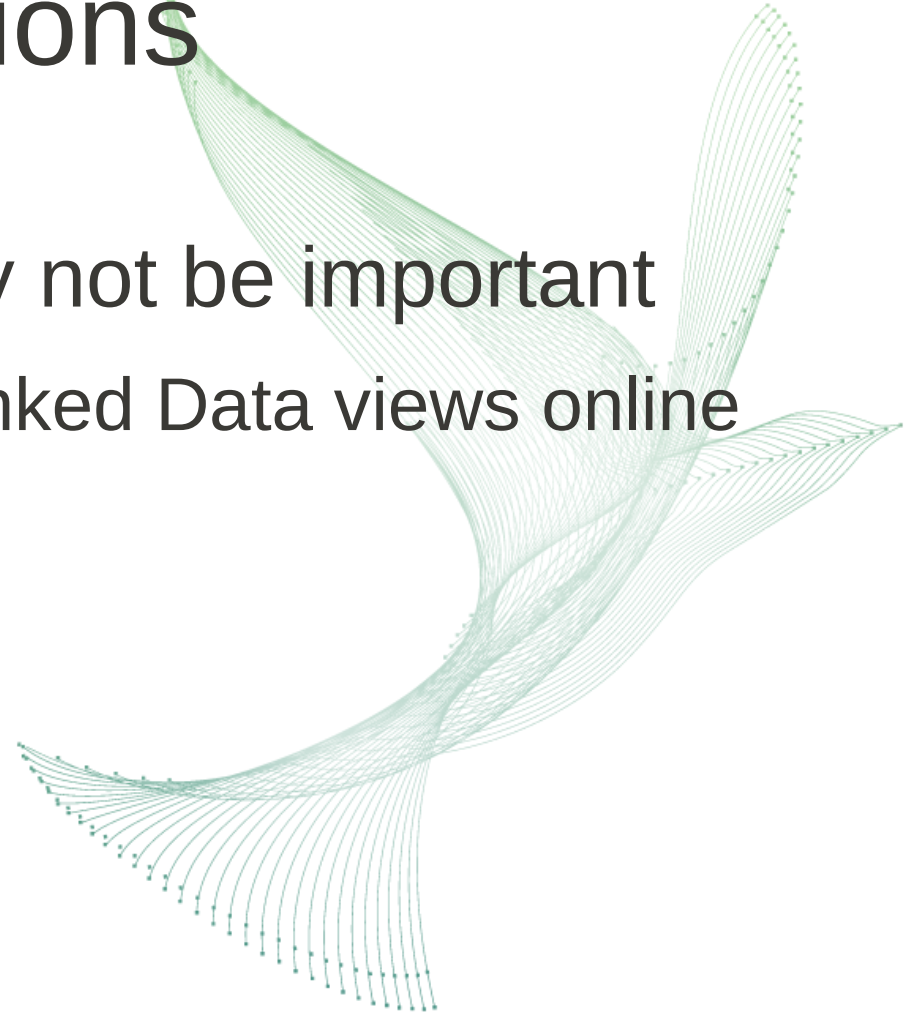
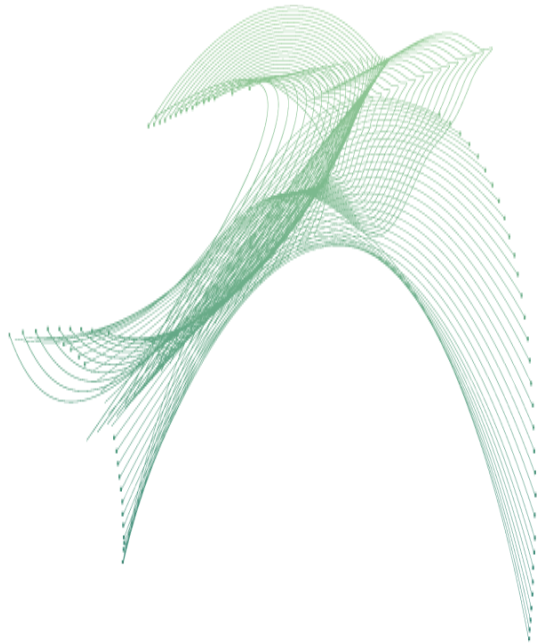
Book: 35 courses

Reflections



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- What we think matters may not be important
 - e.g. native RDF apps vs. Linked Data views online



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- Tooling Reality Check
 - how do we measure up compared to e.g. NoSQL databases, Hadoop, etc?

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- What we think matters may not be important
 - e.g. native RDF apps vs. Linked Data views online
- Tooling Reality Check
 - how do we measure up compared to e.g. NoSQL databases, Hadoop, etc?
- Is numerical data a second-class citizen of the graph?

Questions?



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