Open-Access Educational Publishing

Building Communities and Sharing Knowledge

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Goals of this Talk

- In educational publishing context, explore the *value of community* and *collaboration* over merely *content*
- Discuss how new technologies and approaches to intellectual property enable *entirely new ways of interacting* (people and content)
- Present a case study in *open-access publishing*
  - Connexions: cnx.rice.edu
- An invitation to join the *open-access movement*

Academic Publishing



- **Research journals, monographs, books**
  - communicate research ideas to an *audience of experts* (specialist2specialist)
  - *community* builds on ideas (standing on the shoulders of your peers)
  - small audience (10s of reads, 100s of scans for many technical works)

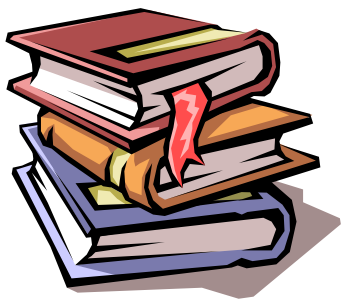
Academic Publishing



- **Educational textbooks, courses, notes**
  - *teach* an audience of non-experts to become experts (specialist2world)
  - used by specialists, instructors, students, other learners
  - potentially large audience (100s-1,000,000 of uses)
  - job of instructor is to *interpret* and *re-contextualize* material
    - instructors continually "*remix*" materials (one-size-fits-all approach not very useful)

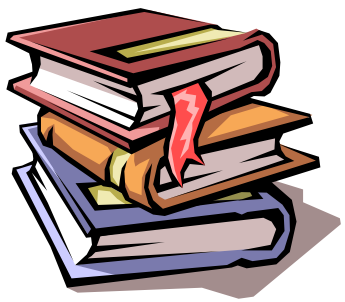
from Traditional Publication …

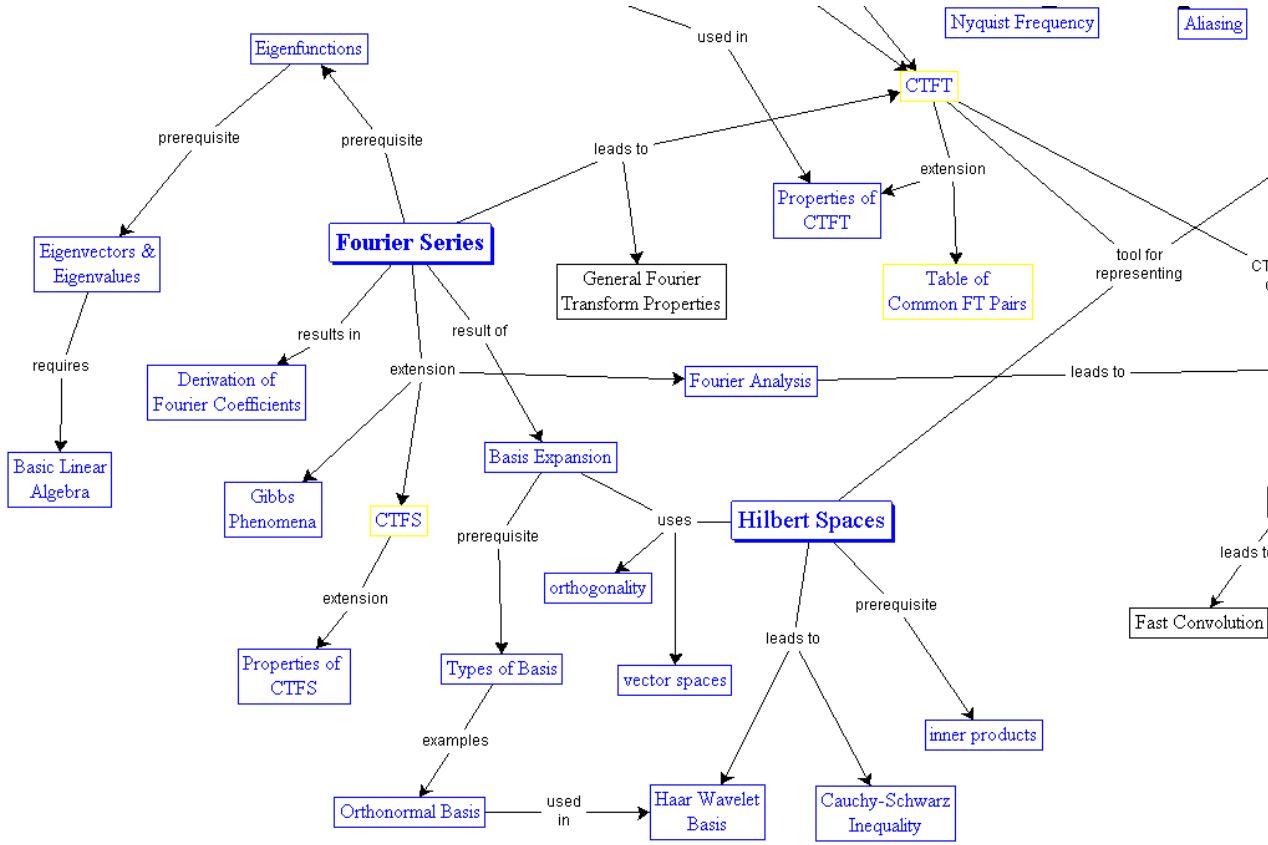
- **Content / Knowledge**
  - stove-piped; disconnected; disintegrated
  - difficult to integrate across disciplines
  - difficult to reach different learning styles



from Traditional Publication …

- **Content / Knowledge**
  - stove-piped; disconnected; disintegrated
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from Traditional Publication …

- **Content / Knowledge**
  - stove-piped; disconnected; disintegrated
  - difficult to integrate across disciplines
  - difficult to reach different learning styles
  - limited access
  - glacially slow development process
  - static

from Traditional Publication …

- **Content / Knowledge**
  - stove-piped; disconnected; disintegrated
  - difficult to integrate across disciplines
  - difficult to reach different learning styles
  - limited access
  - glacially slow development process
  - static
- **Communities**
  - poorly supported
  - collaboration difficult
  - limited feedback
  - not sustainable

Publishing Disconnects

author



Publishers

- production
- distribution

instructors





students

other readers



Publishing Disconnects

information flow

author





instructors





students

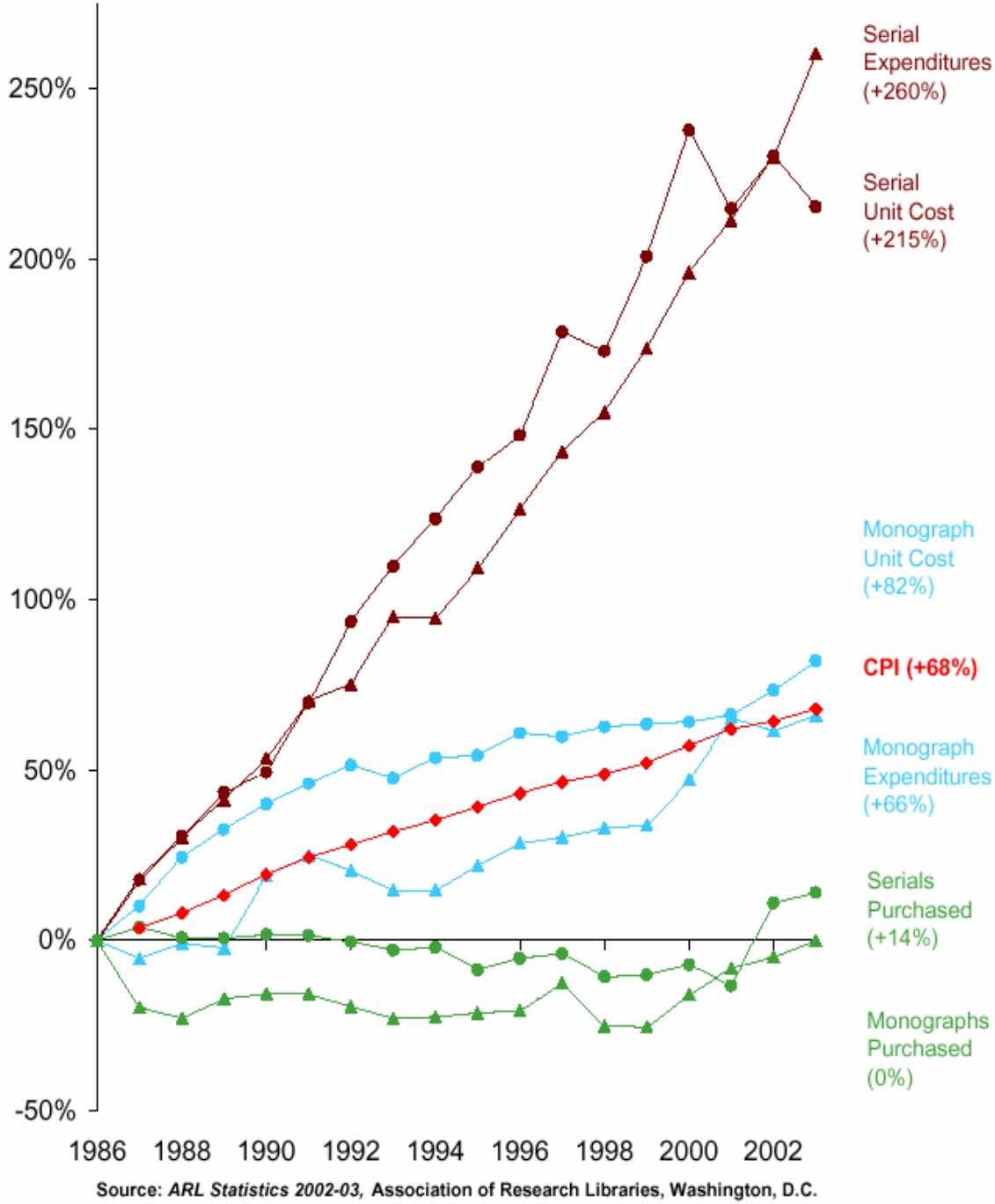
other readers



Publishers

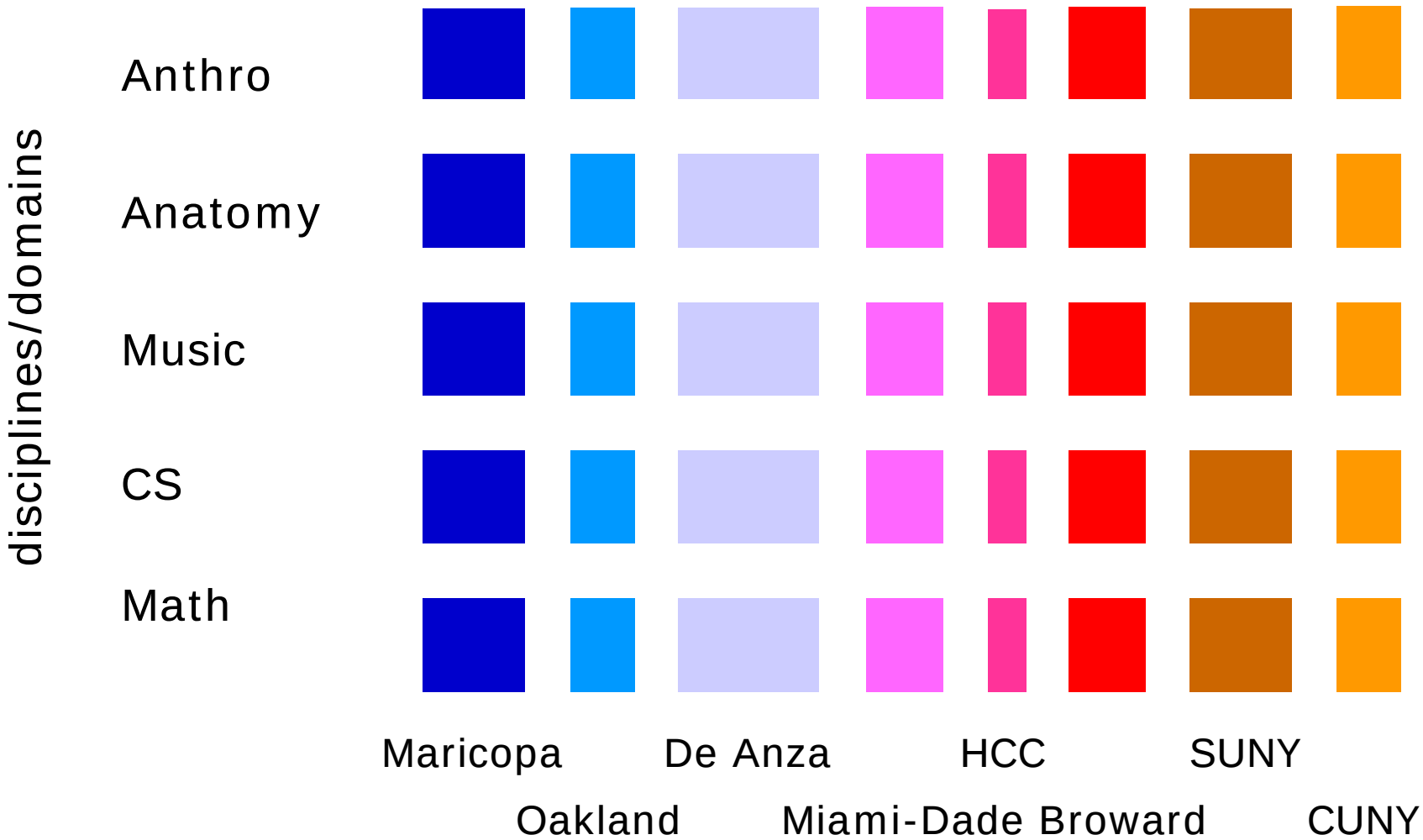
- production
- distribution
- *big $$*
- *control over intellectual property (IP)*

Monographs and serial costs in ARL Libraries 1986-2003

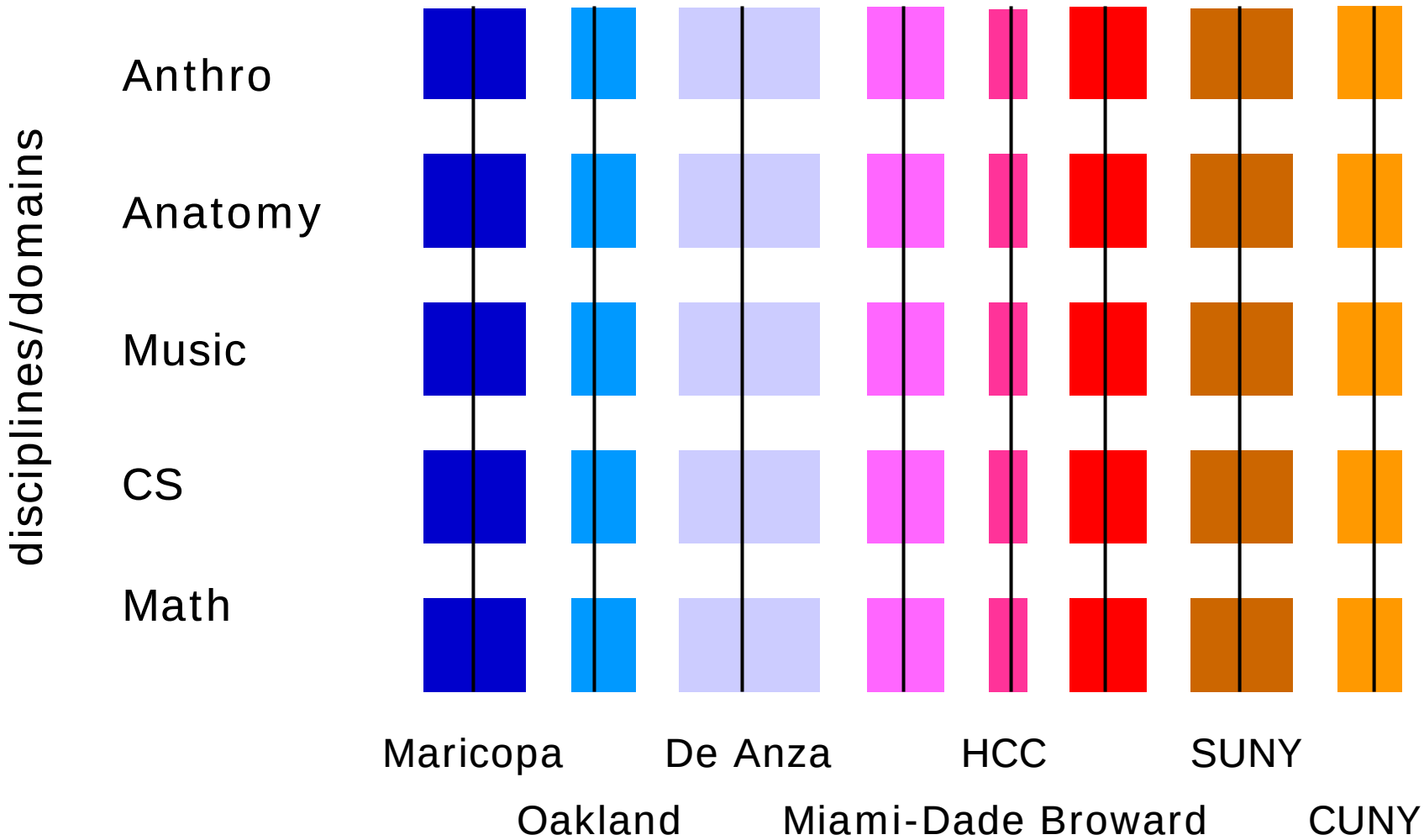


Source: *ARL Statistics 2002-03,* Association of Research Libraries, Washington, D.C.

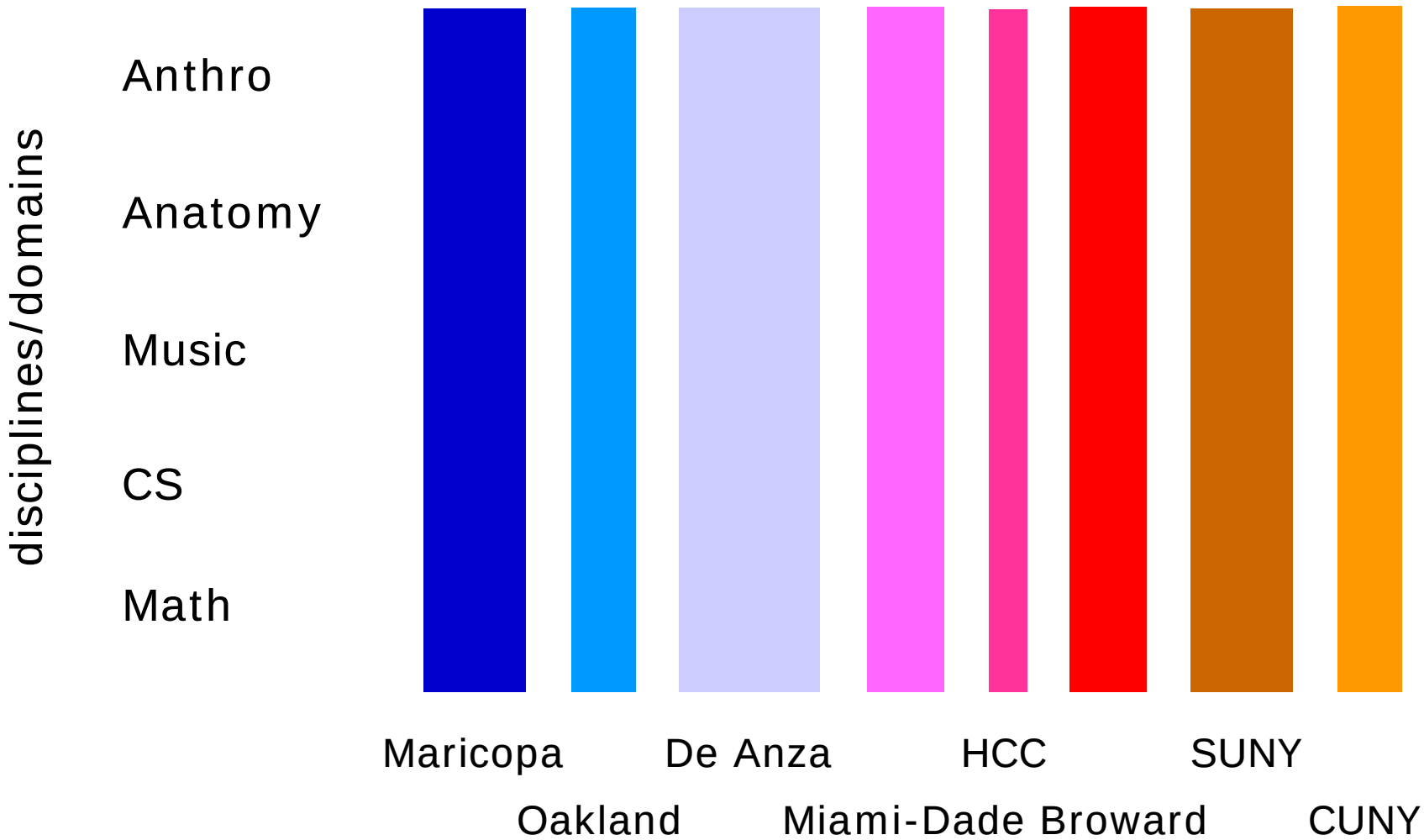
Institutional/Curriculum Disconnections



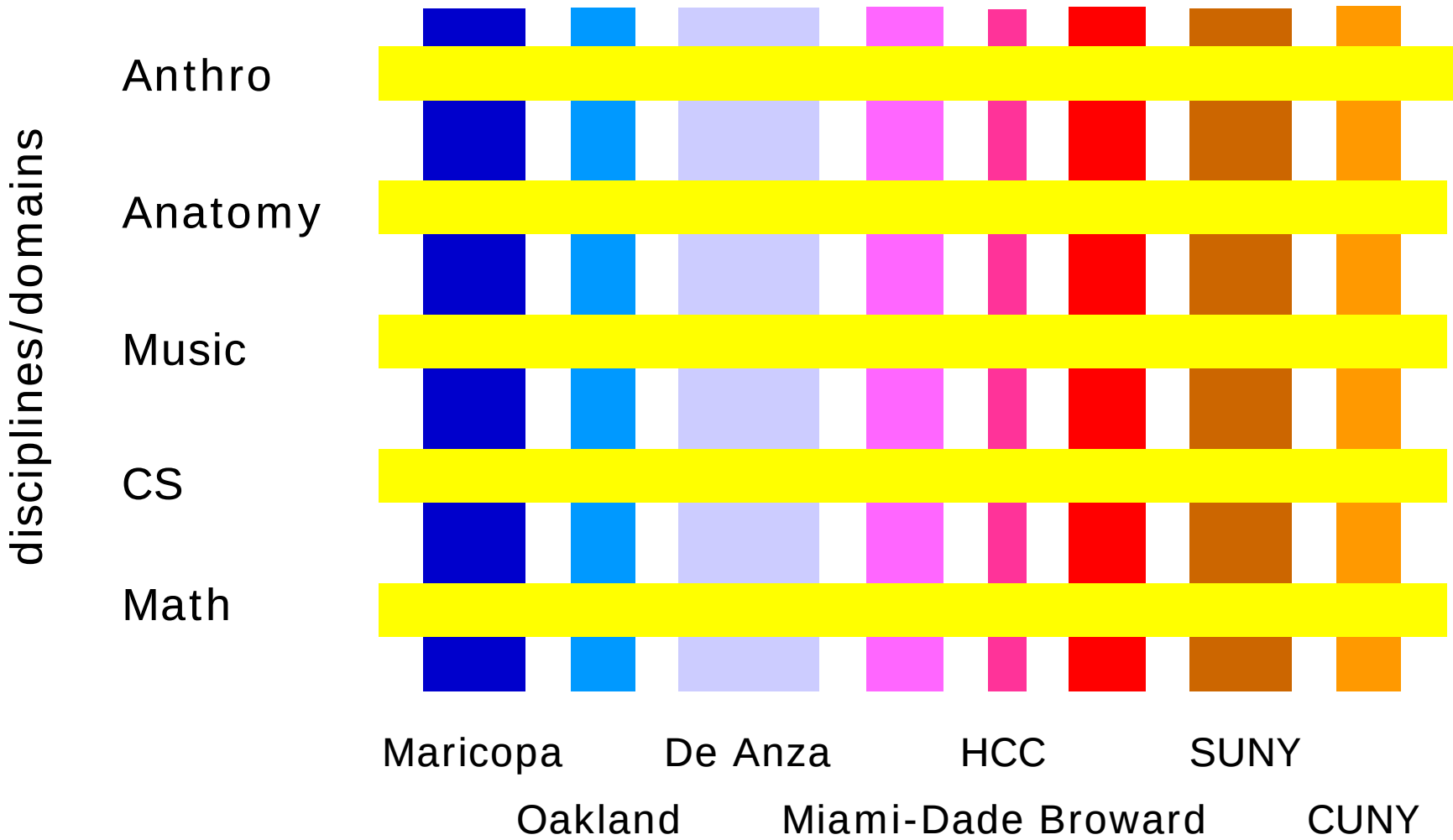
Institutional Repositories



Connect Ideas



Connect Academics into Communities



… to *Collaborative* Publication

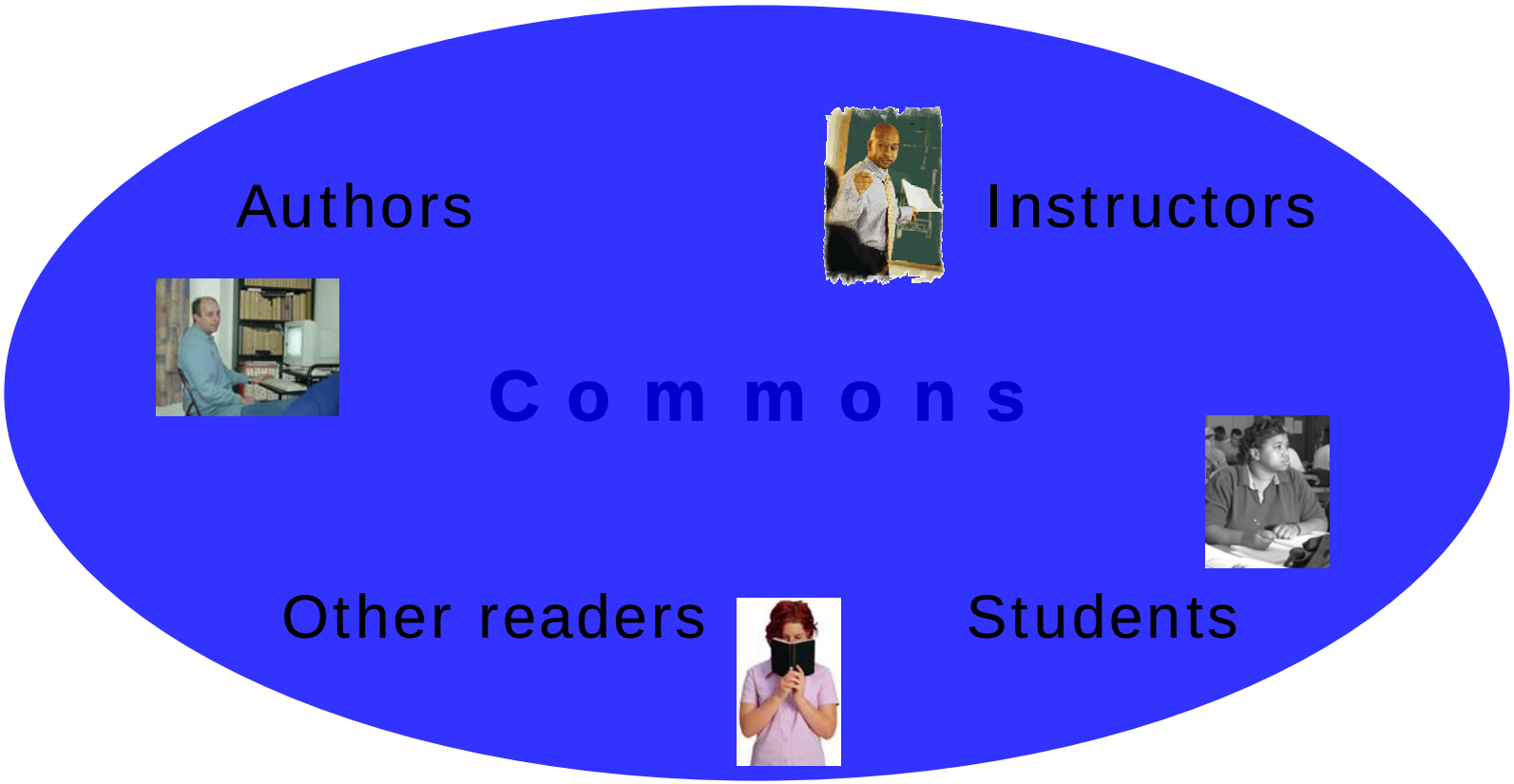
- ***Commons*:** enables collaboration on a *global spatial scale* and *fine time scale*

- **Aim:** change the nature of interactions among *people* and *content*

academics *educators* *students*
organizations *governments* *industry*
public

Commons

- Internet allows authors to speak/work directly with many “users”
- “*Cut out the middleman*” ex: Ebay, ...



Content Commons

If content freely available to

read, copy, modify, redistribute

Then global *communities* of authors can continuously

create, expand, revise, and maintain

materials

Models from *open-source, community-developed software*

GNU/Linux, Apache, Netscape/Mozilla/Firefox, …

Some Benefits

- Potentially *efficient* development
  - leverages efforts of a global community
  - *modular* materials *reusable* in new contexts
  - holistic, *evolutionary curriculum development*

- *Breaks down barriers* to entering author *community*
  - potential to drastically *reduce author time commitment*
  - authors write about what excites them
  - broader impact for teaching materials
  - teachers/students can become authors

Some Benefits

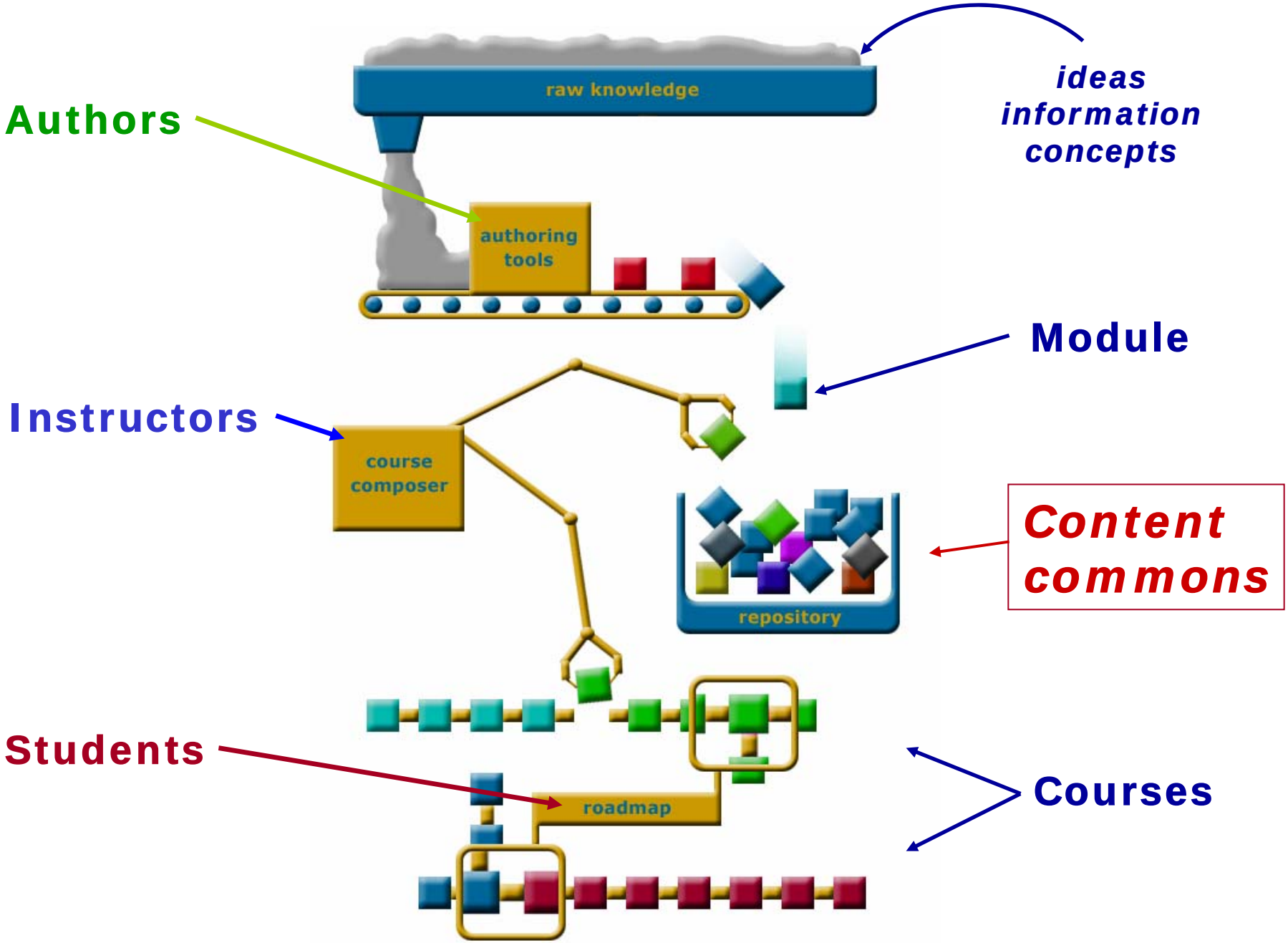
- *Connectivity*
  - students/instructors can see/explore *connexions between ideas*
  - enables *cross-disciplinary education*
  - draw recent research results into educational process

- *Dynamic – iterative refinement – evolution*
  - "close the loop" in cycle of
    - *develop* learning materials
    - *use* them for learning
    - *assessment* feedback

Case Study – *Connexions*

Knowledge should be free, open, and shared

- *Connexions* is a rapidly growing ***commons*** of *free scholarly materials* and a set of *free software tools* to help
  - *authors* worldwide publish and collaborate
  - *instructors* worldwide rapidly build and share custom courses
  - *learners* worldwide explore the links among concepts, courses, and disciplines
- Global; cross-institutional; grassroots organized
- Fosters collaboration and communities
  - inclusive; anyone can play
  - encourages re-use and re-contextualization of materials


Authors
raw knowledge
ideas
information
concepts
authoring
tools
Module
Instructors
course
composer
Content
commons
repository
Students
roadmap
Courses

Opportunities for Academics

- Connecting *content* with *context*
- Multimedia content

- Leveraging and *extending academic culture* and enterprise globally
  - new opportunities to *interact*
  - diversity, innovation, dynamism, feedback

- *Broader impact* for teaching materials

- Supporting emergence of *new disciplines*
  - nanotechnology, bioinformatics, complex systems, …

Computer Science

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sharing knowledge and building communities

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Example links

- A page written in CNXML
- The CNXML language
- The MathML language

Supplemental links

- XML.com
- Unicode
- The XML specification

Similar content

- Editing CNXML with XMLSpy
- Combining the DTDs of XML Languages
- Combining XML Languages

MORE SIMILAR CONTENT »

Courses using this content

- CNXML Tutorial
- Connexions Tutorial and Reference

PERSONALIZE

XML Basics

[PDF] [Edit]

By: SARAH COPPIN, BRENT HENDRICKS

Table of Contents | NEXT >>

Summary: This module describes XML (eXtensible Markup Language) and the rules that govern its usage. It also explains what a well-formed and valid document is.

What is XML?

The eXtensible Markup Language (**XML**) is a **meta-markup language** defined by the World Wide Web Consortium (W3C). It is not strictly a markup language itself, but rather a set of rules for creating markup languages. For our purposes a **markup language** is any language (HTML, for example) that uses tags surrounding text to convey information such as content or format. CNXML, the markup language used by the Connexions Project is an example of a language written in XML. There are many other examples at the W3C site. Here is an example of some markup in CNXML.

```
<para>
  This is a paragraph in <term>CNXML</term>.  Notice that the markup
  contains tags that express the meaning of the text.
</para>
```

`<para>` and `</para>` are the tags that the enclose the text. In XML, tags are always marked by angle brackets (also known as

Intellectual Property

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sharing knowledge and building communities

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- Manuscript of Jefferson Letter to McPherson, 1813
- Library of Congress Copyright Office
- United States Patent and Trademark Office
- Legal Information Insitute: US Legal Code
- Copyright Law: Title 17
- Patent Law: Title 35
- Trademark Law (Lanham Act): Title 15, Chapter 22

Similar content

- Harmony
- Sound Reasoning

Courses using this content

- Text as Property/Property as Text

PERSONALIZE

Choose a style

- Summer Sky

A Primer in Modern Intellectual Property Law

[PDF] [Edit]

By: CHRISTOPHER KELTY

Summary: This is a very broad primer in intellectual property law from the perspective of its original justification, and the basic legal and institutional distinctions that accompany it in the modern period (roughly 1700-2000).

The Role of Law in Modern Society

The importance of law in modern societies is hard to overestimate. The systems are complex, the institutions are diverse and range from small to mammoth, and the number of people involved, from para-legal to federal judge, can only be proof of its central role in society. And yet, for the most part, law and legal issues are left to lawyers, legal theorists and the occasional sociologist. For most people, the law is only reluctantly confronted during those signature events in life: marriage, paying taxes, immigrating, or suing the buttwipe in the SUV who smashed up your right-hand rear-view mirror. And so it should be.

Intellectual Property (IP) Law, however, seems to have broken this mold. For about twenty years, IP law has slowly become something more and more people confront. It is not only becoming easier to violate the law, due to changing technology, but it is also becoming much easier and more common for people to use the law to police their own intellectual property. In order to understand what this body of law consists of, where it came from, and what it's original justification and current uses were and are, it's necessary to look more carefully at both the law, and the reasons for its existence.

The origin of American Intellectual Property Law

Intellectual Property law stretches back at least to the 17th century, and depending on the definition, further. However, as with many modern government institutions, it was given a special place in the American constitution. It is interesting to note that the

K-12+ Music

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Courses using this content
- Reading Music: Standard Notation

PERSONALIZE

Choose a style
- Summer Sky
- Desert Scape
- Charcoal

Pitch: Sharp, Flat, and Natural Notes

[PDF] [Edit]

By: CATHERINE SCHMIDT-JONES

Summary: In standard notation, a sharp symbol raises the pitch of the natural note by a half-step; a flat symbol lowers it by a half-step.

The **pitch** of a note is how high or low it sounds. Pitch depends on the FREQUENCY of the FUNDAMENTAL sound wave of the note. The higher the frequency of a sound wave, and the shorter its WAVELENGTH, the higher its pitch sounds. But musicians usually don't want to talk about wavelengths and frequencies. Instead, they just give the different pitches different letter names: A, B, C, D, E, F, and G. These seven letters name all the **natural** notes (on a keyboard, that's all the white keys) within one octave. (When you get to the eighth natural note, you start the next OCTAVE on another A.)

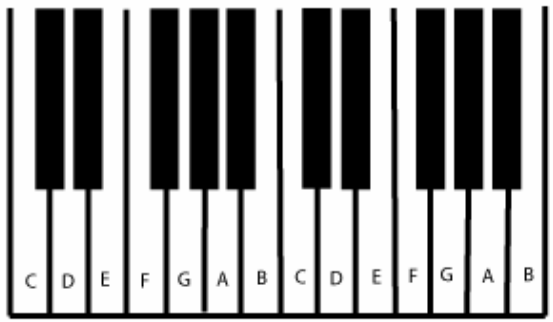


Figure 1: The natural notes name the white keys on a keyboard.

History



Figure 1: Johannes Hevelius observing with one of his telescopes. (Source: Selenographia, 1647)

The telescope was one of the central instruments of what has been called the Scientific Revolution of the seventeenth century. It revealed hitherto unsuspected phenomena in the heavens and had a profound influence on the controversy between followers of the traditional **geocentric astronomy** and cosmology and those who favored the heliocentric **system of Copernicus**. It was the first extension of one of man's senses, and demonstrated that ordinary observers could see things that the great Aristotle had not dreamed of. It therefore helped shift authority in the observation of nature from men to instruments. In short, it was the prototype of modern scientific instruments. But the telescope was not the invention of scientists; rather, it was the product of craftsmen. For that reason, much of its origin is inaccessible to us since craftsmen were by and large illiterate and therefore historically often invisible.

Biodiversity Data



Digital Signal Processing (DSP)

Reduce Samples VI - Mozilla

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- Summer Sky
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Reduce Samples VI

Print (PDF)

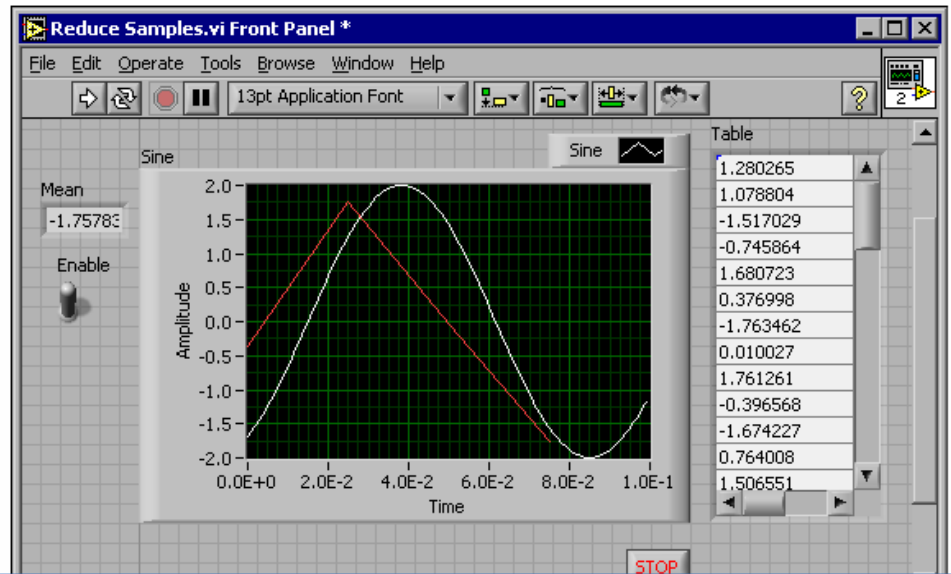
By: MALAN SHIRALKAR

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Summary: Use the LabVIEW documentation resources to build a VI that generates a signal, reduces the number of samples in the signal, and displays the resulting data in a table on the front panel.

PROBLEM 1

In the following exercises, you will open a blank VI and add Express VIs and structures to the block diagram to build a new VI. When you complete the exercise, the front panel of the VI will appear similar to the FIGURE 1.



Prototype DSP Community

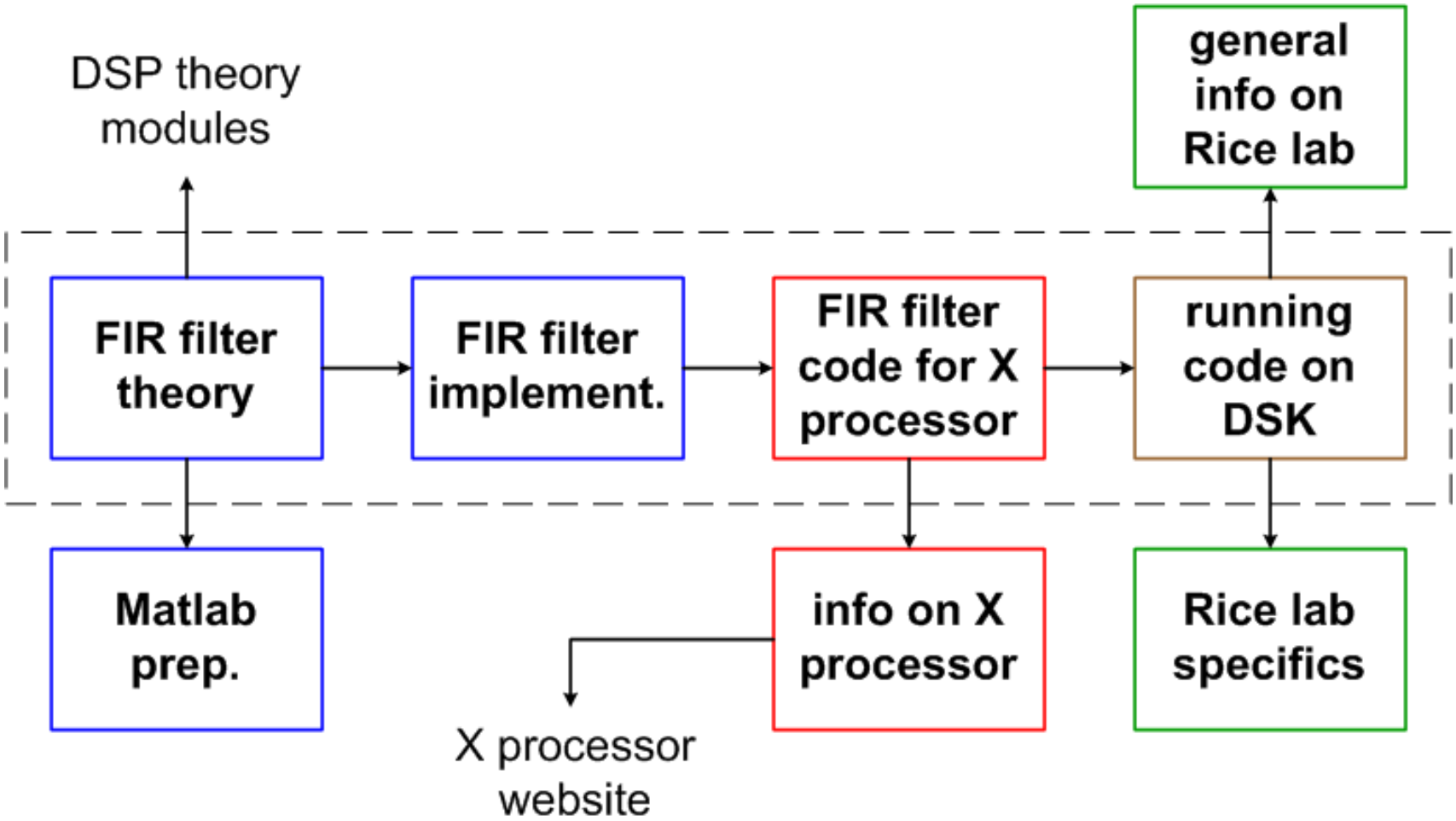


- *Cross-institutional* community in Digital Signal Processing
  - Rice, Stanford, UC-Berkeley, Illinois, Michigan, Wisconsin, Ohio State, Georgia Tech, Polytechnic
  - Ecole Polytechnique, ENST, ENS-Lyon, INRIA (France), EPFL (Switzerland), Cambridge (UK), NTNU (Norway), Verona (Italy)
  - National Instruments and Texas Instruments
  - Translations into Japanese, Chinese, Thai, Spanish, ...

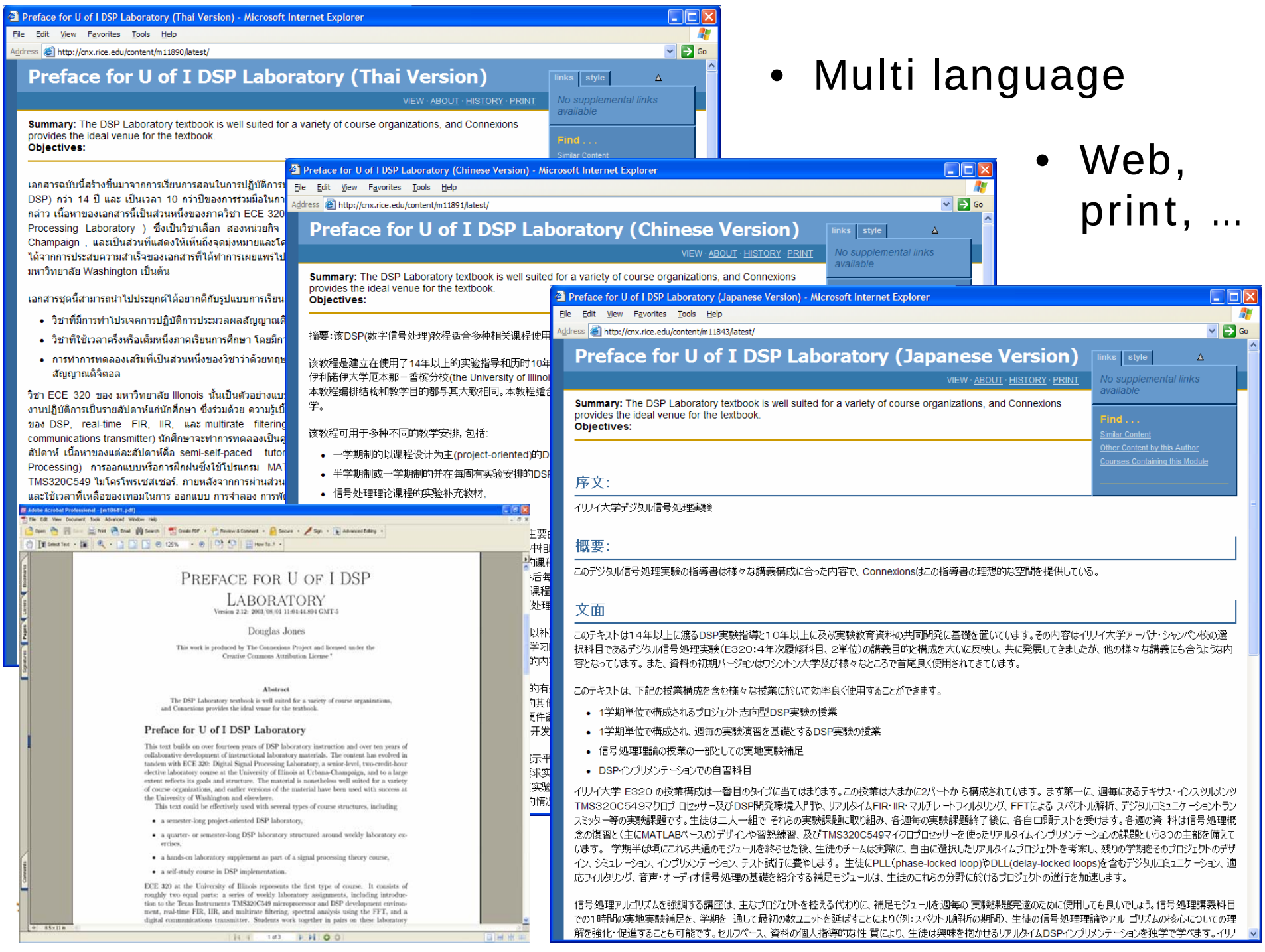
- Complete Rice Electrical and Computer Engineering *core undergrad curriculum*
  - goal: 15+ interlinked courses with prerequisites
  - 1/3+ complete

DSP Labs in Connexions

- UIUC, OSU, Rice sharing TI DSP Labs



- Multi language
- Web, print, ...



Content Commons

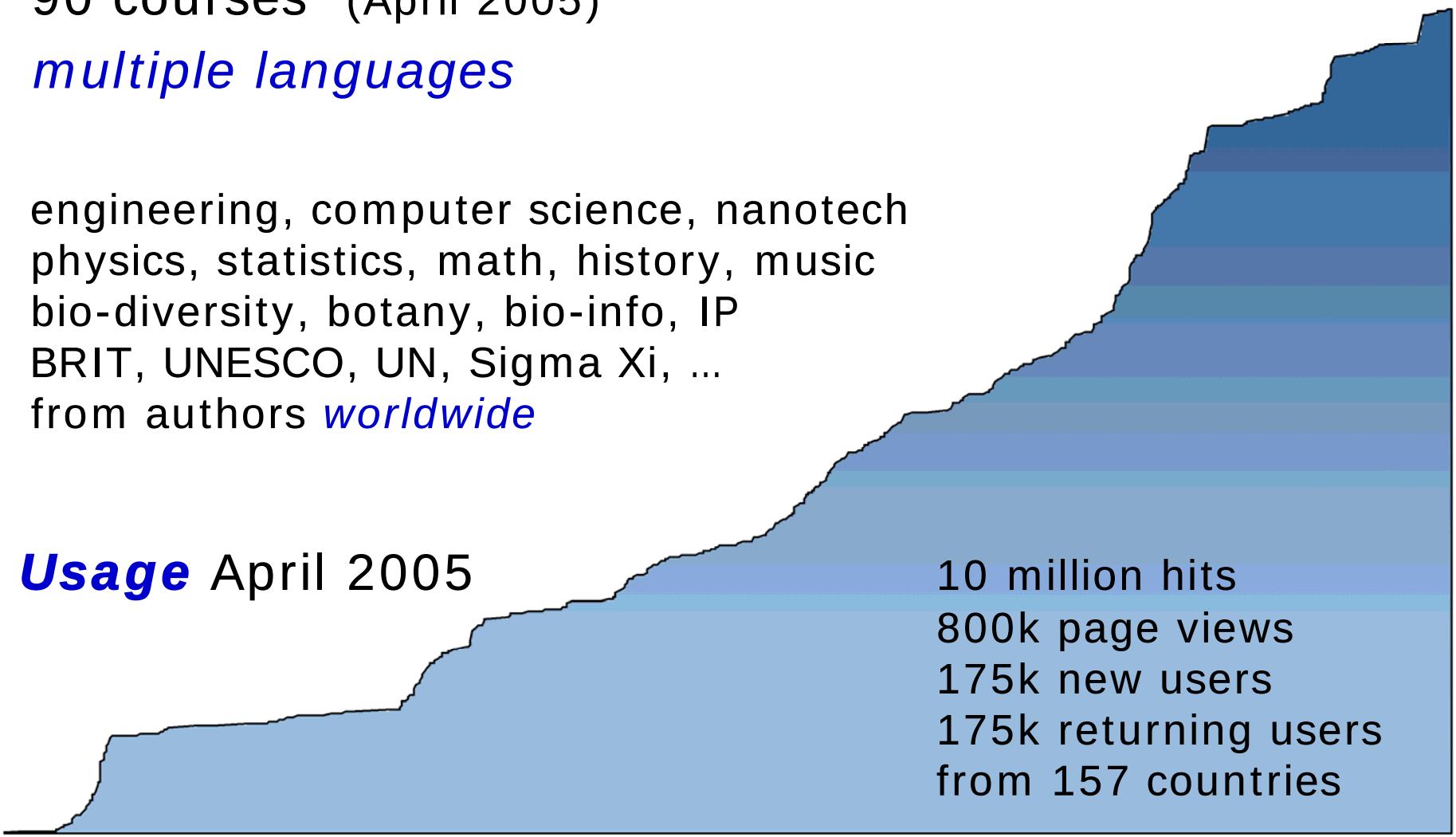
2500 modules

90 courses (April 2005)

multiple languages

engineering, computer science, nanotech
physics, statistics, math, history, music
bio-diversity, botany, bio-info, IP
BRIT, UNESCO, UN, Sigma Xi, ...
from authors *worldwide*

Usage April 2005



Enabling a Commons

1. Common ***intellectual property*** framework
   - *reuse* typically requires *modification*
   - busy faculty do not have time to chase down copyright holder (*not scalable*)
   - must be integrated into content
2.
3.

Open Content Licensing

- Current IP regime *discourages sharing*

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- *Creative Commons* Licenses
  - *common legal vocabulary* for sharing content
  - create a kind of “public domain” using licensing

Open Content Licensing

- Current IP regime *discourages sharing*

- *Creative Commons* Licenses
  - *common legal vocabulary* for sharing content
  - create a kind of “public domain” using licensing
  - collaborators since August 2002 (versions 1.0, 2.0)
  - 10 million web pages CC licensed in February 2005

  - license provisions:
    - *author retains copyright* on each module / course
    - *author licenses* material to the world at large

    ✓ attribution
    ✓ commercial use
    ✓ derivative works (modification)
    ✓ share alike (“copyleft”)

creativecommons.org

Open Content Licensing

- Recent developments
  - Public Library of Science (PLoS) - MIT OpenCourseWare
  - Berlin Declaration (EU) - Budapest Initiative
  - Peru, Brazil, Argentina, Mexico open-source initiatives
  - Wilco
- Commercial collaborators

  FedexKnkos, Cambridge University Press
  National Instruments, Texas Instruments
- Sharing, (re)use: IP must be *integrated* into content
- *Author education* is key
  - fair-use, IP workshops with UPenn Annenberg School

Perfect Third

Note Names

As mentioned above, Indian music, like Western music, recognizes seven notes that can be sharped or flatted to get twelve notes within each octave. A flat note is called **komal**. A sharp note is called **teevra**.

Indian Note Names

Letter Name	C	D	E	F	G	A	B
Western Name	Do	Re	Mi	Fa	Sol	La	Ti
Indian Name	Sa	Re	Ga	Ma	Pa	Dha	Ni

Figure 2

Comments, questions, feedback, criticisms?

Discussion forum

Join the discussion »

Send feedback

- E-mail the author
- E-mail Connexions

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Perfect Third

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« Back to Commons Deed

- Who owns *your* content?

Enabling a Commons

1. Common *intellectual property* framework

2. Common ***technology*** *framework*
   - enable *reuse, sharing*
     - must integrate technology into content
     - modularity, semantic markup (XML), meta data, …
   - support *connectivity*
     - hyperlinks, …
   - *manage* modules and courses

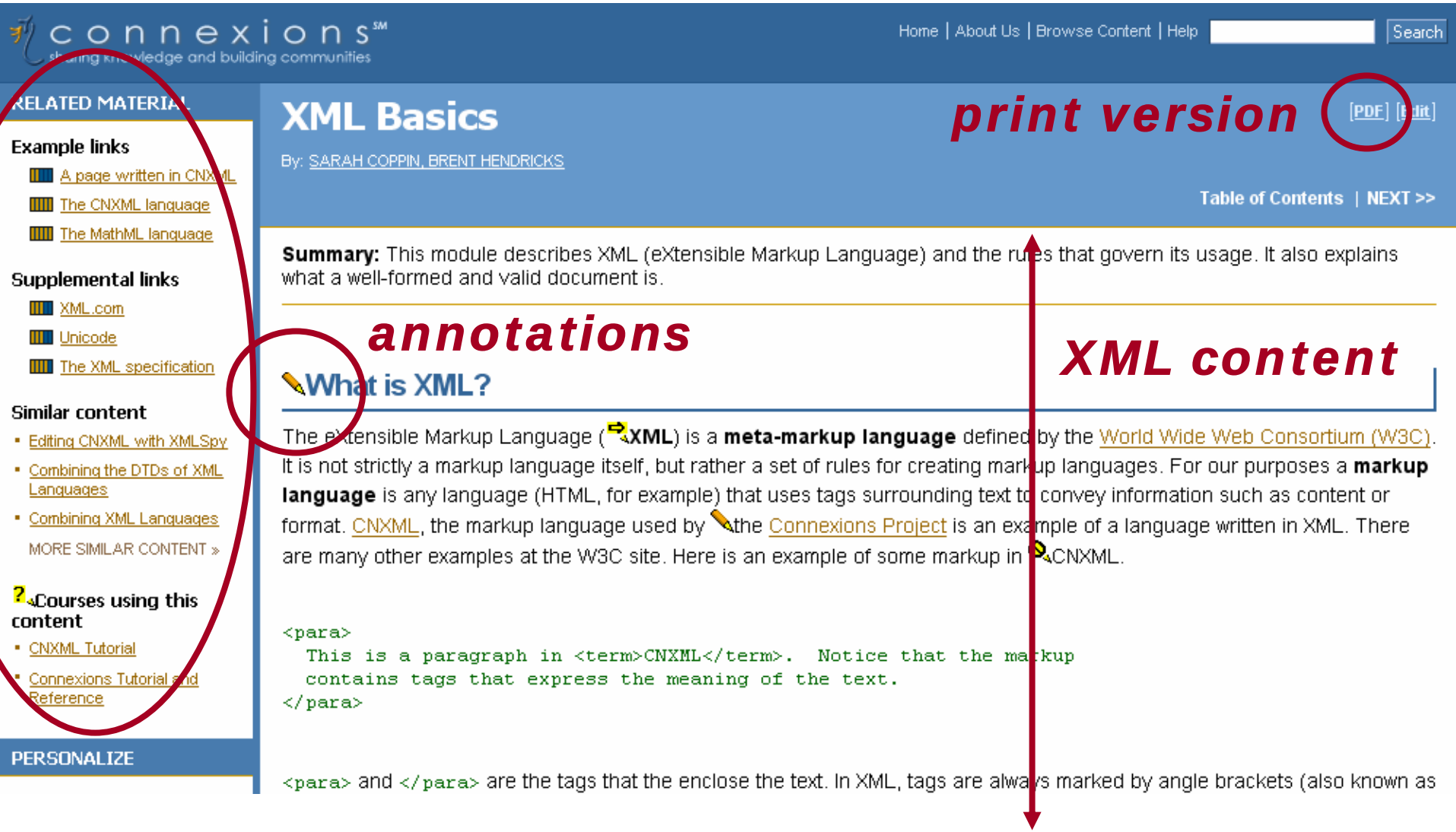
3.

Connexions – Tools

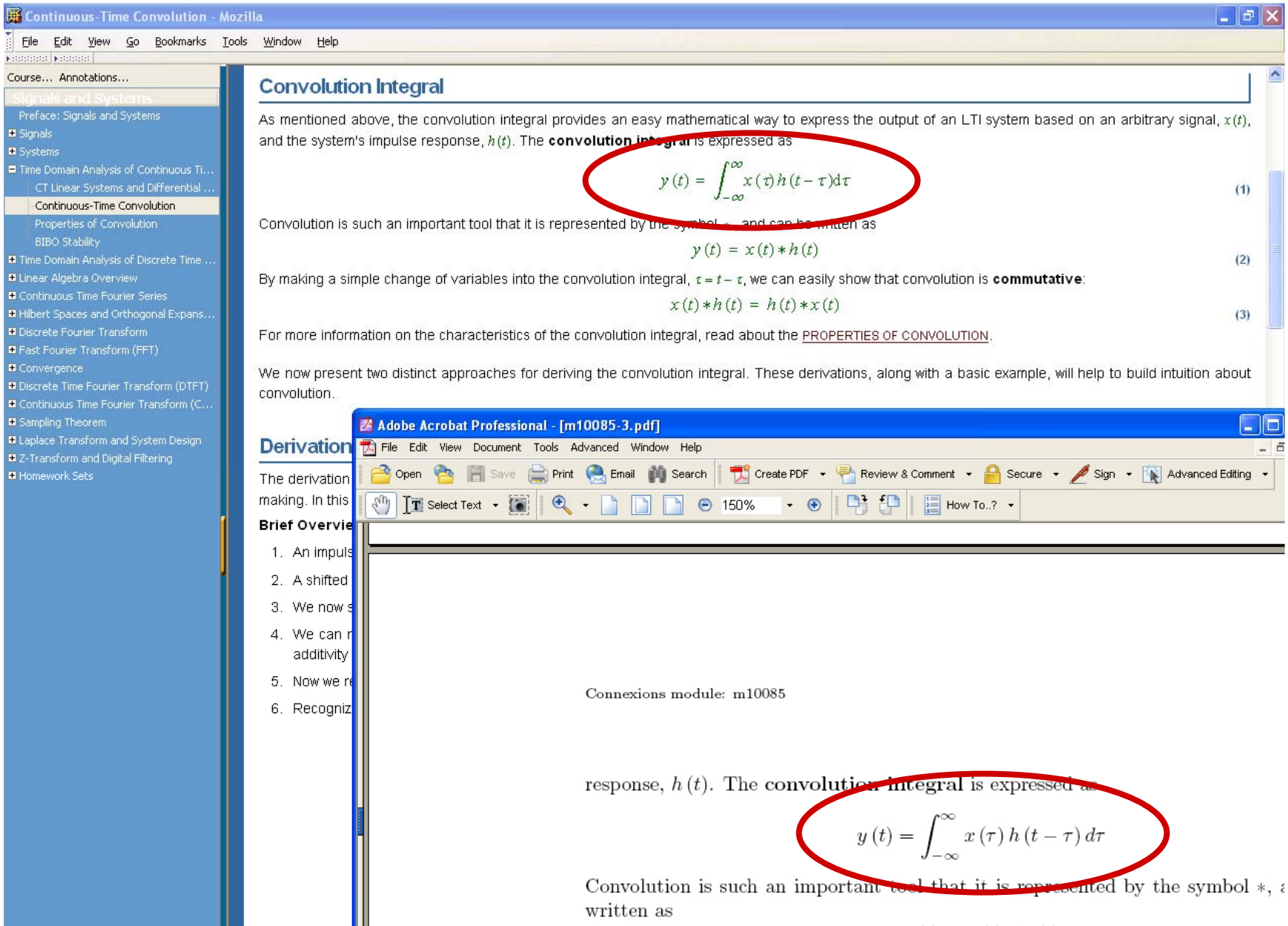
- *Focal point* for educational open-access and re-mix
  - avoid content fragmentation
- *Open-source toolkit* to manage Connexions repository
  - based on *Plone/Zope*
  - *XML* based “modules”
  - tools to help students *navigate* the commons
  - tools to aggregate modules into customized *courses*
  - tools to generate *print-on-demand* textbooks
  - *annotation* tools
  - *discussion forums*
  - *multi-language* support
- Beware of the *techno chasm*! (usability)

Connexions Module

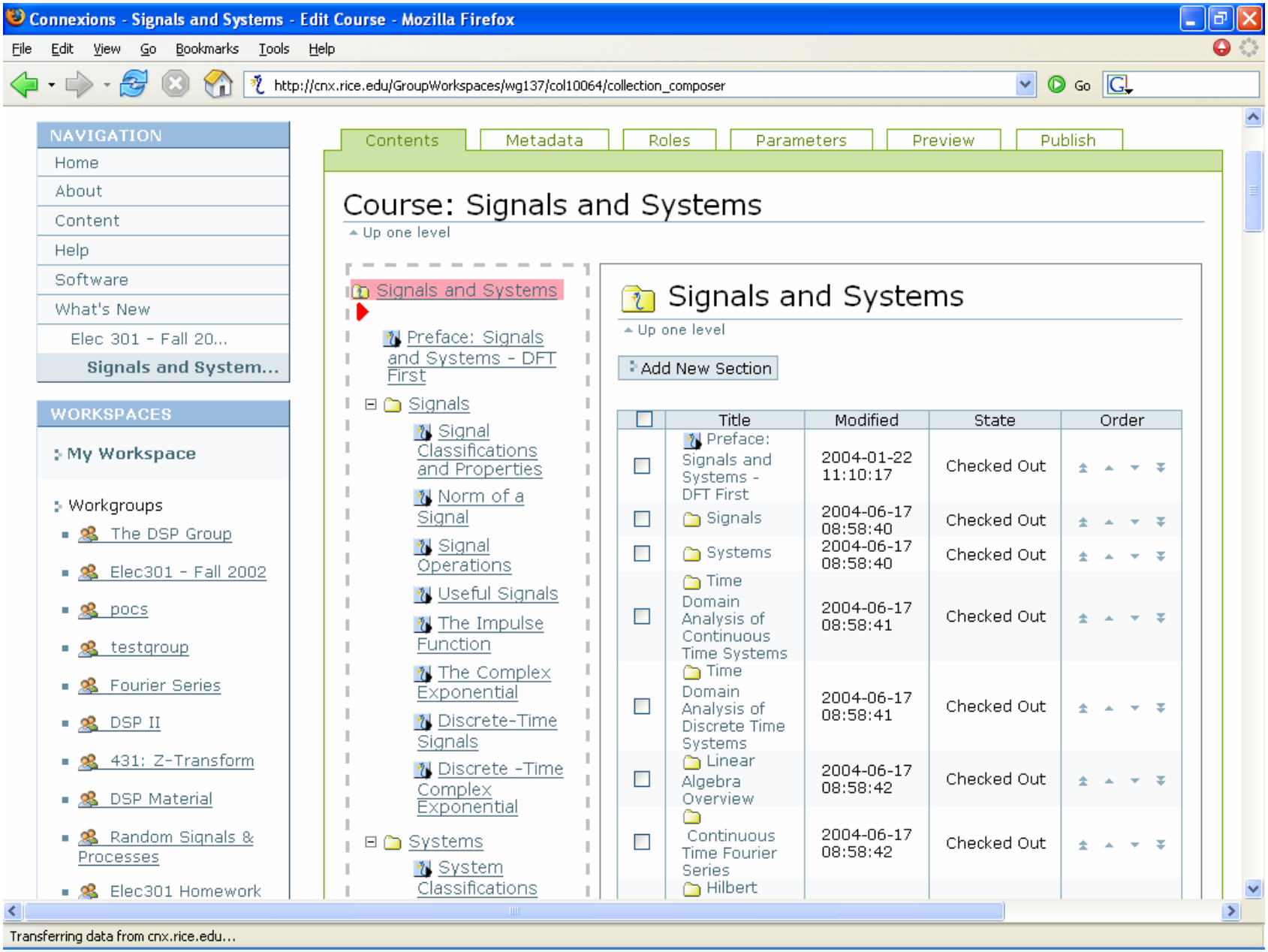
links



Mathematics via MathML

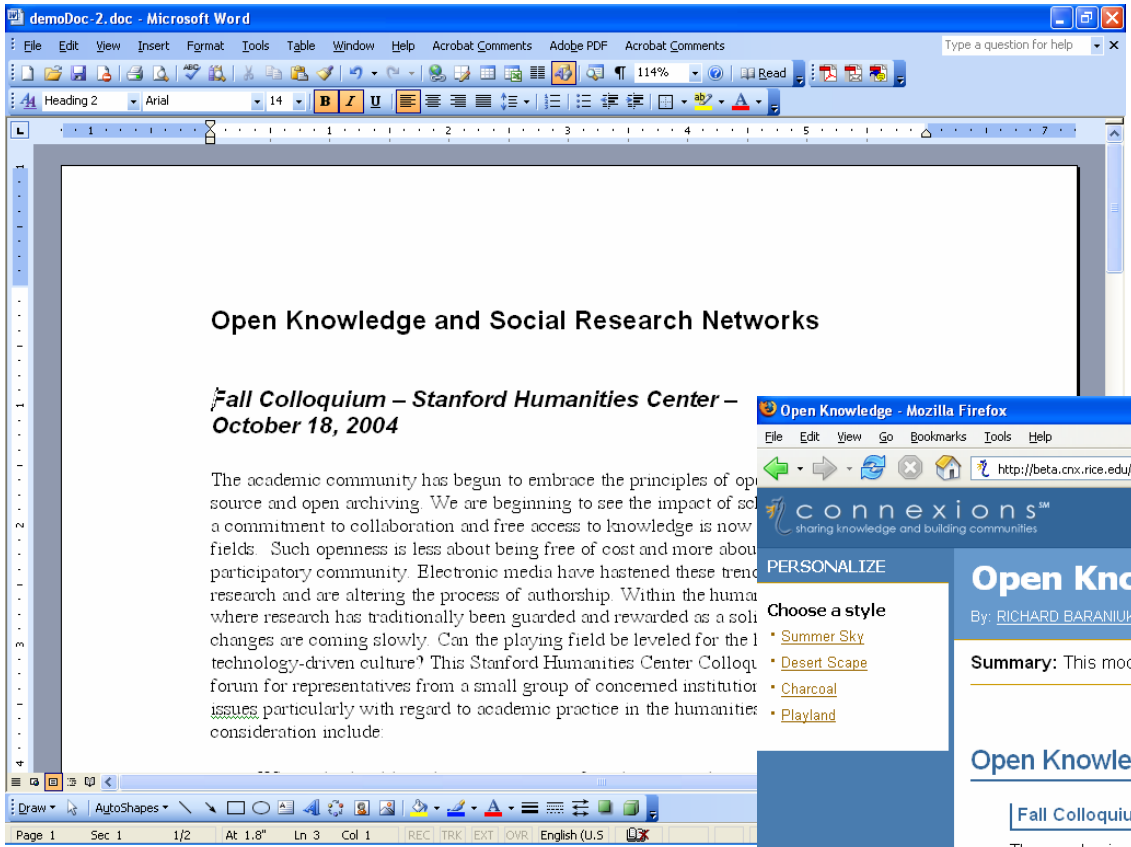


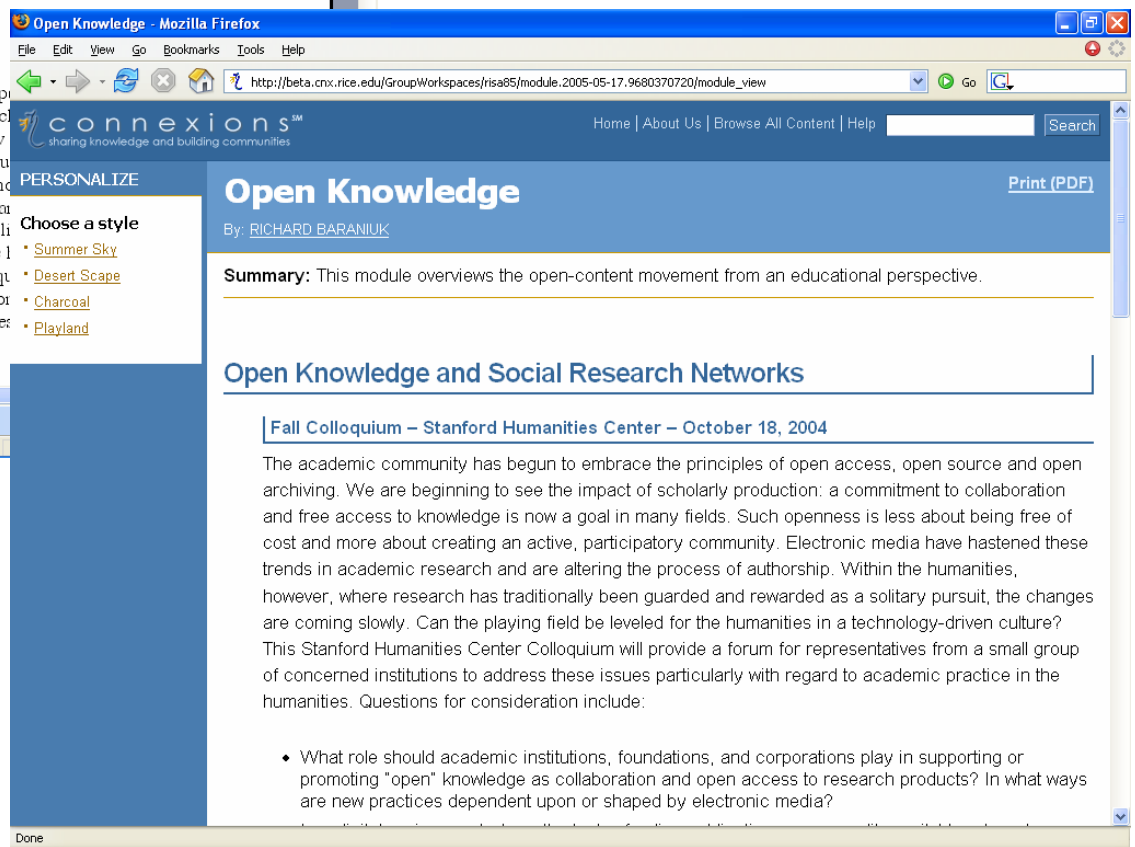
Course Composer



MS Word to XML Converter

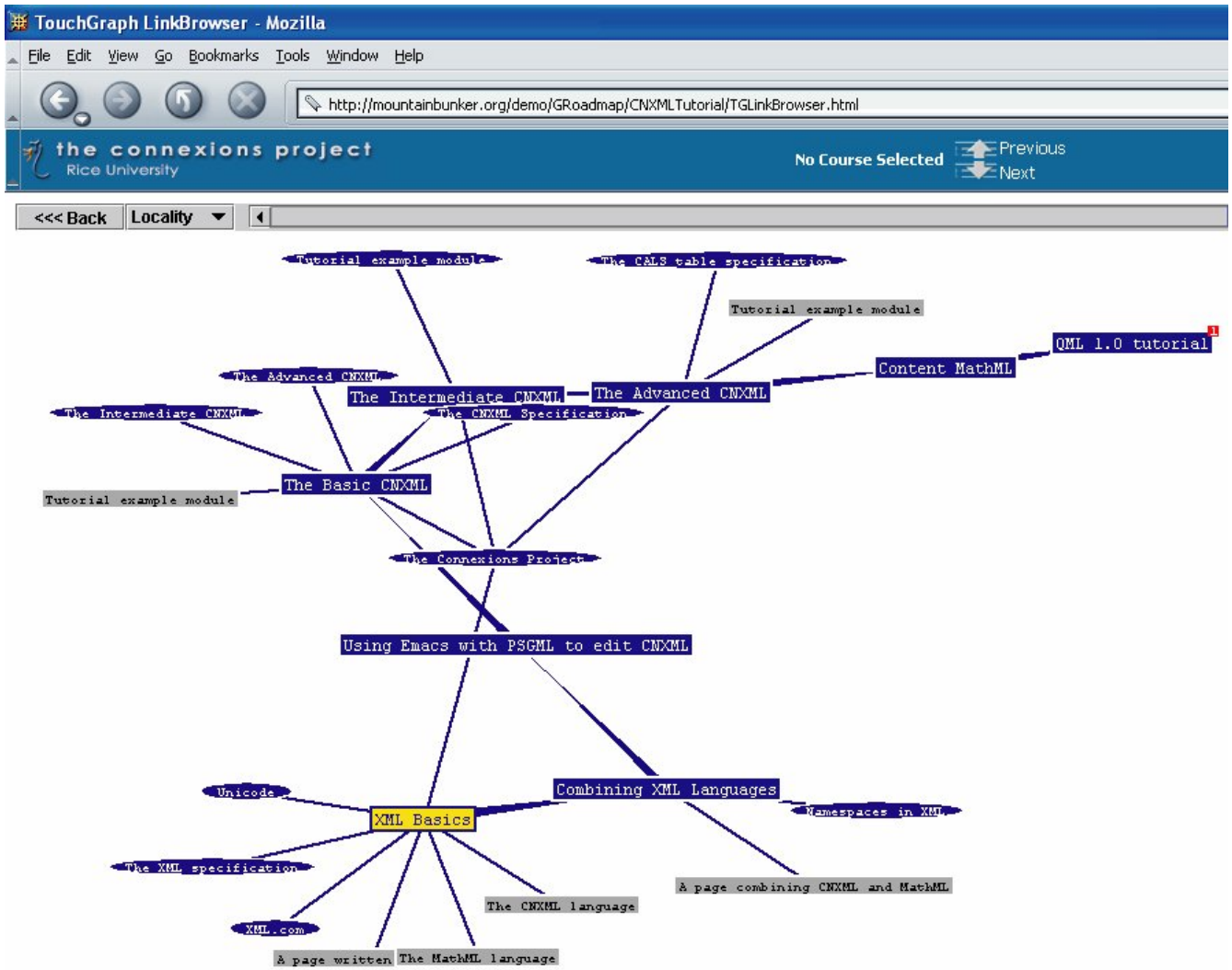
(*beta*.cnx.rice.edu)





Concept Navigation

- Explore the interconnections between ideas



Connexions – What's Coming?

- Authoring tools
  - MS Word to XML converter (**beta.cnx.rice.edu**)
  - LaTeX to XML converter
  - Open-source XML editor (code name: Etna)
- Distributed post-publication *peer review* system
- Distributed, federated Connexions repositories
- More languages
  - Spanish, Chinese, Japanese, Thai
- Community tools
  - community pages; author profile pages
  - wiki's, blogs, … RSS

Technology Standards

- **Goal**: build a ***commons***
- It's not a matter of defining standards;
  it's a matter of *building a community*
- ***Don't standardize first; build community first***
- *Grassroots* rather than imposed top-down
- Lesson from open-source world:
  "standard = rough consensus and working code"
  ex: SGML vs. HTML
- Work toward common formats; should be
  – semantic, open, *extensible* (*XML*)

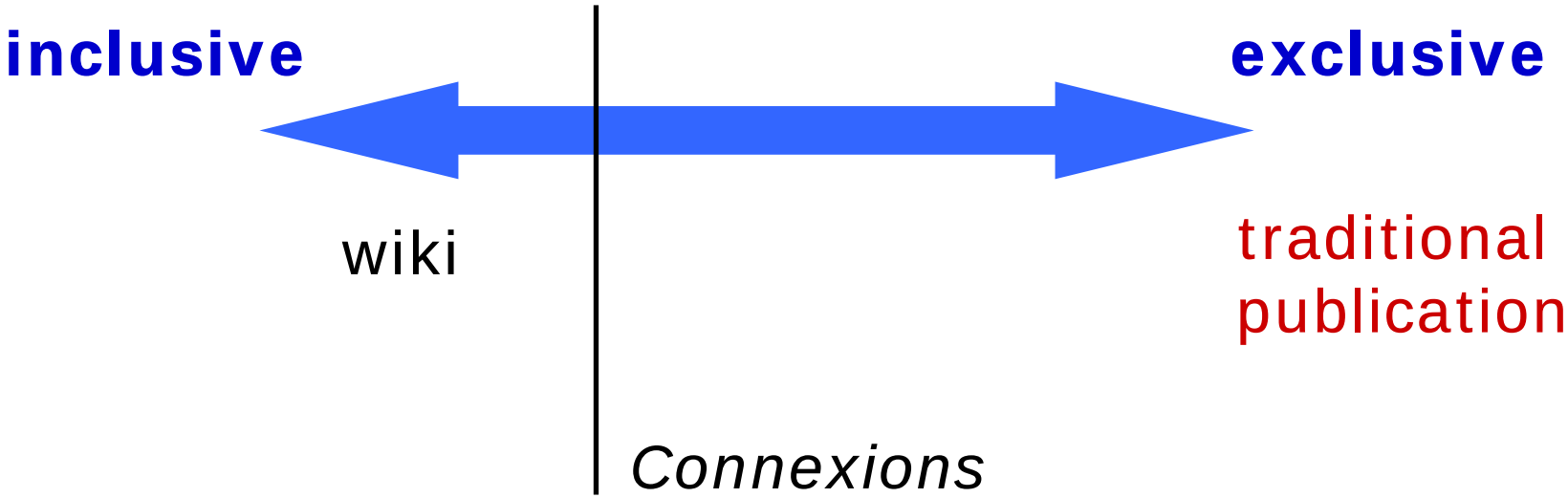
Enabling a Commons

1. Common *intellectual property* framework
2. Common *technology* *framework*
3. Common cultural ***vision, goals, norms***

Open Access Vision

- Academics are accustomed to *sharing*
- Open access need not cut into commercial sales
  - Ex: CUP's free on-line books sell more copies!
- Many authors comfortable balancing immediate *royalties* for *impact*
  - Ex: 10 hours of consulting > year of book royalties
- But what about *control* over the content?

Authorship Continuum



- author
- copyright holder
- maintainer
- co-author
- forking (derived copy)

Quality Assessment

- Requirements:
  - *evaluate* and *credential* modules and courses
  - *direct* users to high-quality materials

- Traditional approach: *pre* publication peer review
  - natural when publication medium is scarce
  - costly and slow
  - exclusive rather than inclusive
  - *not scalable* to evolutionary development; feedback
  - does not support evaluation based on actual student learning in the field

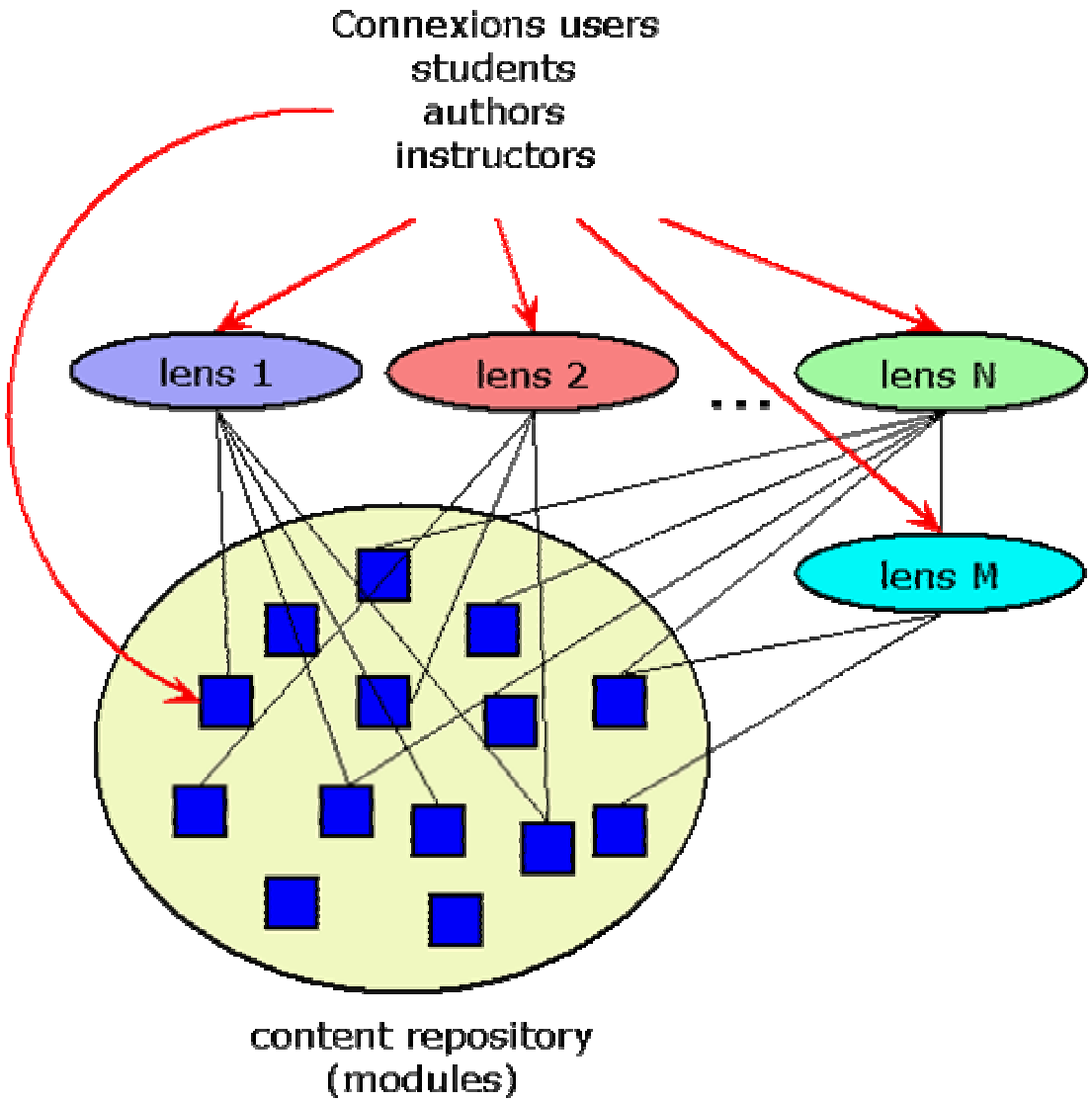
Post-publication Review: *Lenses*

- *Distributed* peer review
- View modules/courses through ***lenses*** (filters)
- Each lens has its own *focus*
- Lenses provided by *3rd parties*

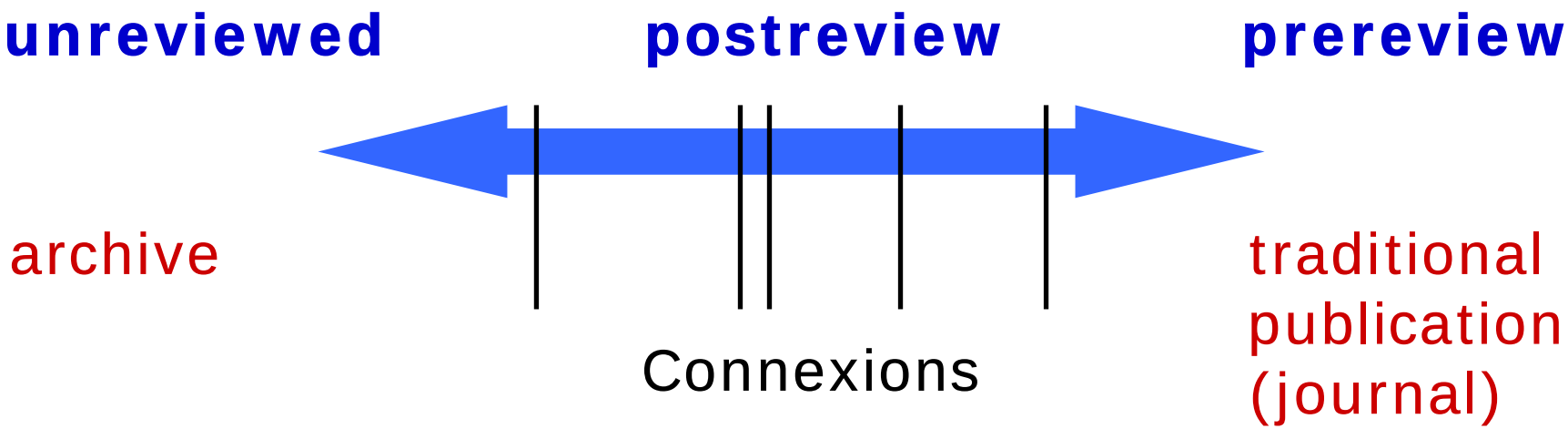
professional society
university, CC, school bd
publisher, colleagues

most popular, linked
collaborative filtering
user rating, blogs

learning assessment rating



Review Continuum



- Can operate at *multiple points* on the continuum
  - trade off feedback timescale, flexibility, labor, $, …
- Issues:
  - *prestige* is what counts for promotion, tenure, …
  - new metrics of impact?

Summary

- Opportunity to *reinvent* academic enterprise
  - more can participate
  - share materials and best practices
  - save time
  - more fun, community-oriented, vibrant
- Community *is* king
  - norms, goals, vision
  - technology
  - IP
- What to do?
  - educate authors on open access
  - participate, experiment!
  - institution's role?

Challenges

- *Community development*
  - thinking, writing modularly and collaboratively
  - conceptual barriers to reuse
- *Intellectual property*
  - protecting arguments, points of view while encouraging openness
- Quality assessment and peer review
  - how to scale up for large-scale, evolutionary development?
- *Tools*
  - must be open, easy to use, and intuitive
  - design cannot ignore social issues
  - *beware of the chasm!*

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