Connexions

Building Communities and Sharing Knowledge

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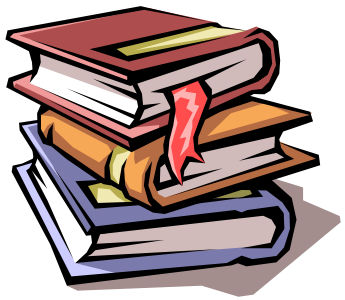
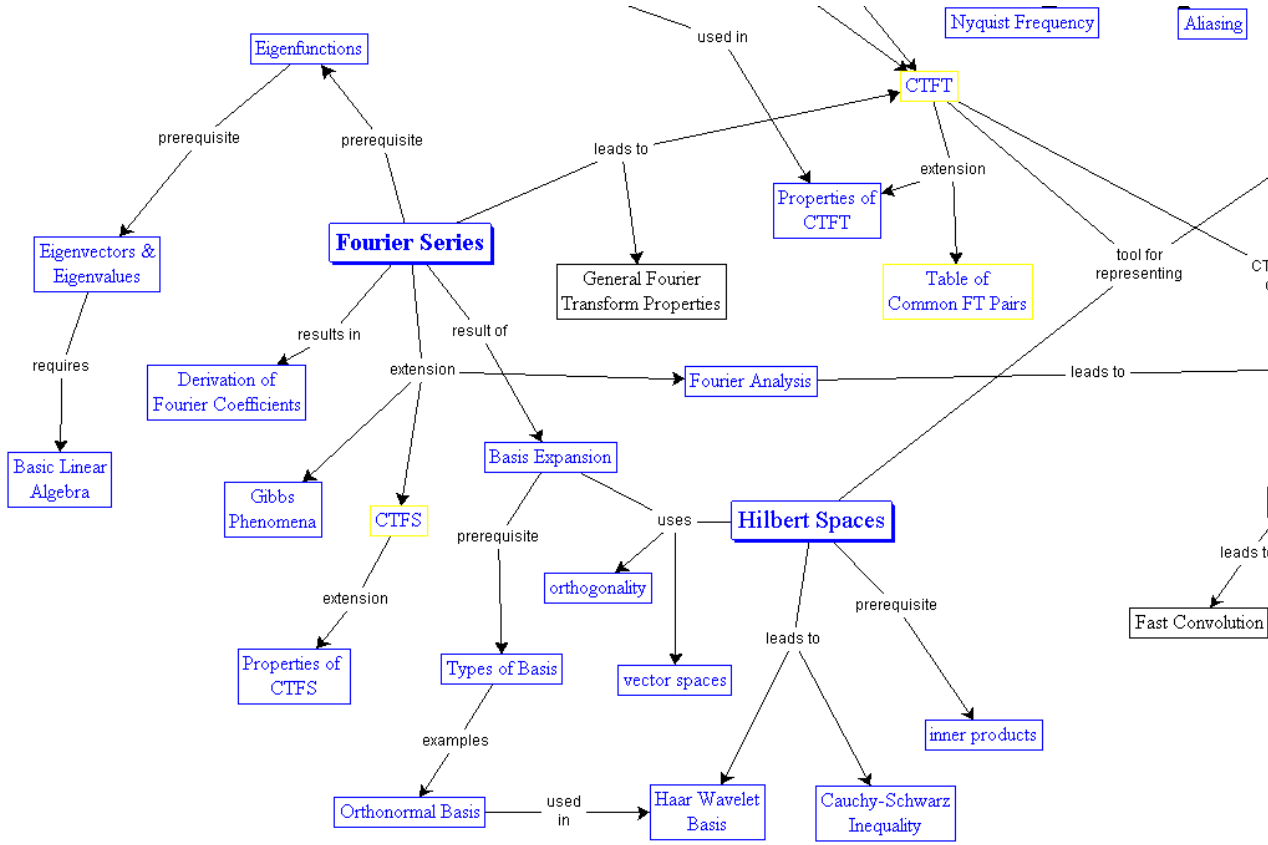
from Traditional Publication …

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





from Traditional Publication …

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

... to *Collaborative* Publication

- Collaboration on a *global spatial scale*
  fine time scale

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

scientists *educators* *students*
organizations *governments* *industry*
public

Connexions

Knowledge should be free, open, and shared

- *Connexions* is a rapidly growing *commons* of free scholarly materials and a powerful 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

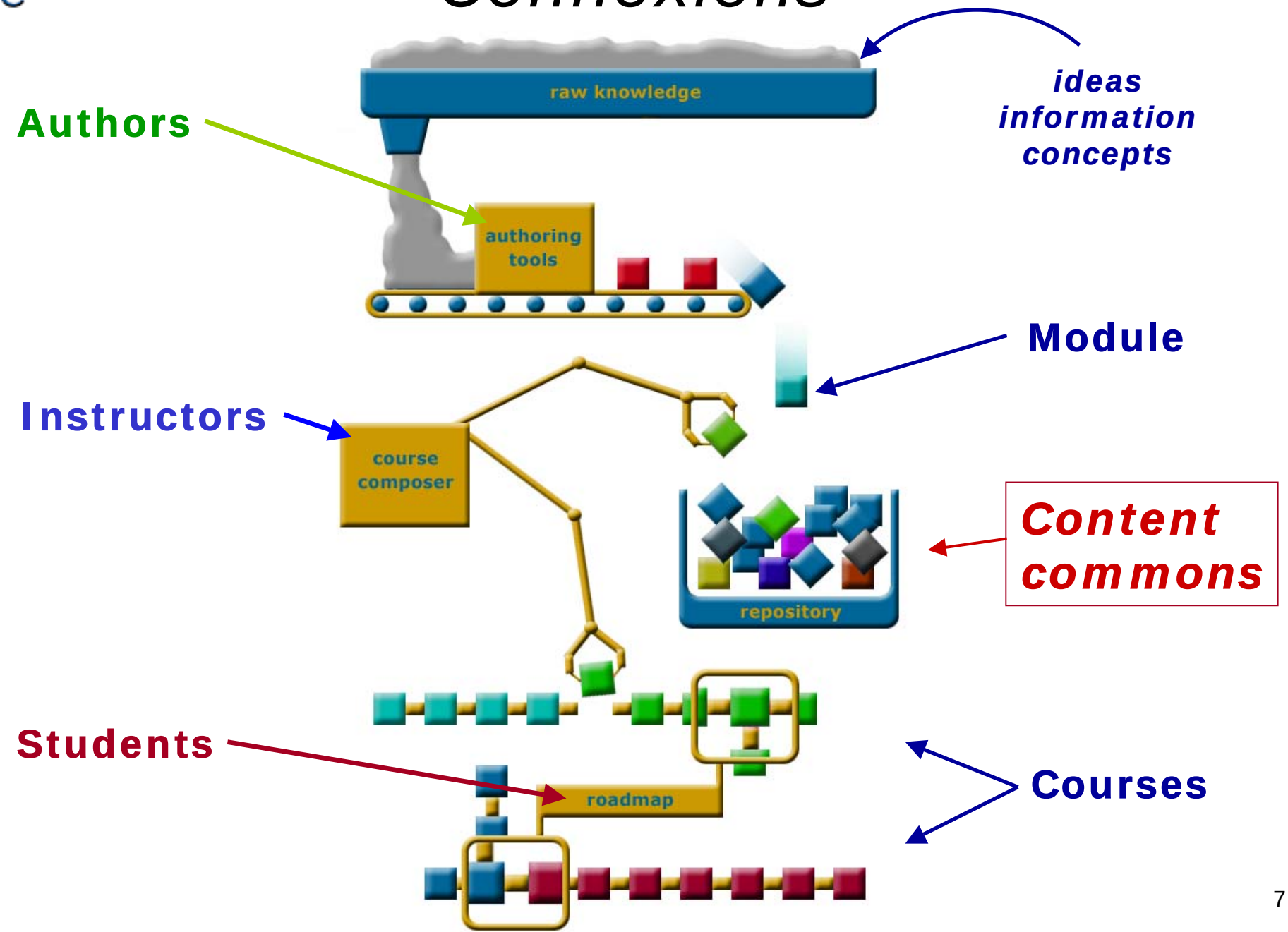
Connexions

- ***Commons*** of educational materials
  - forum for creating knowledge; *living repository*
  - open access; *open contribution*
  - *global; cross-institutional; grassroots organized*
  - *feedback*

- ***Collaboration*** and ***Reusability***
  - technologically (XML, open-source toolkit)
  - intellectual property (Creative Commons licenses)
  - educationally (modular, “learning objects”)
  - multi language support

- Connexions aims to serve the global educational community

Connexions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concepts
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Instructors
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repository
Content
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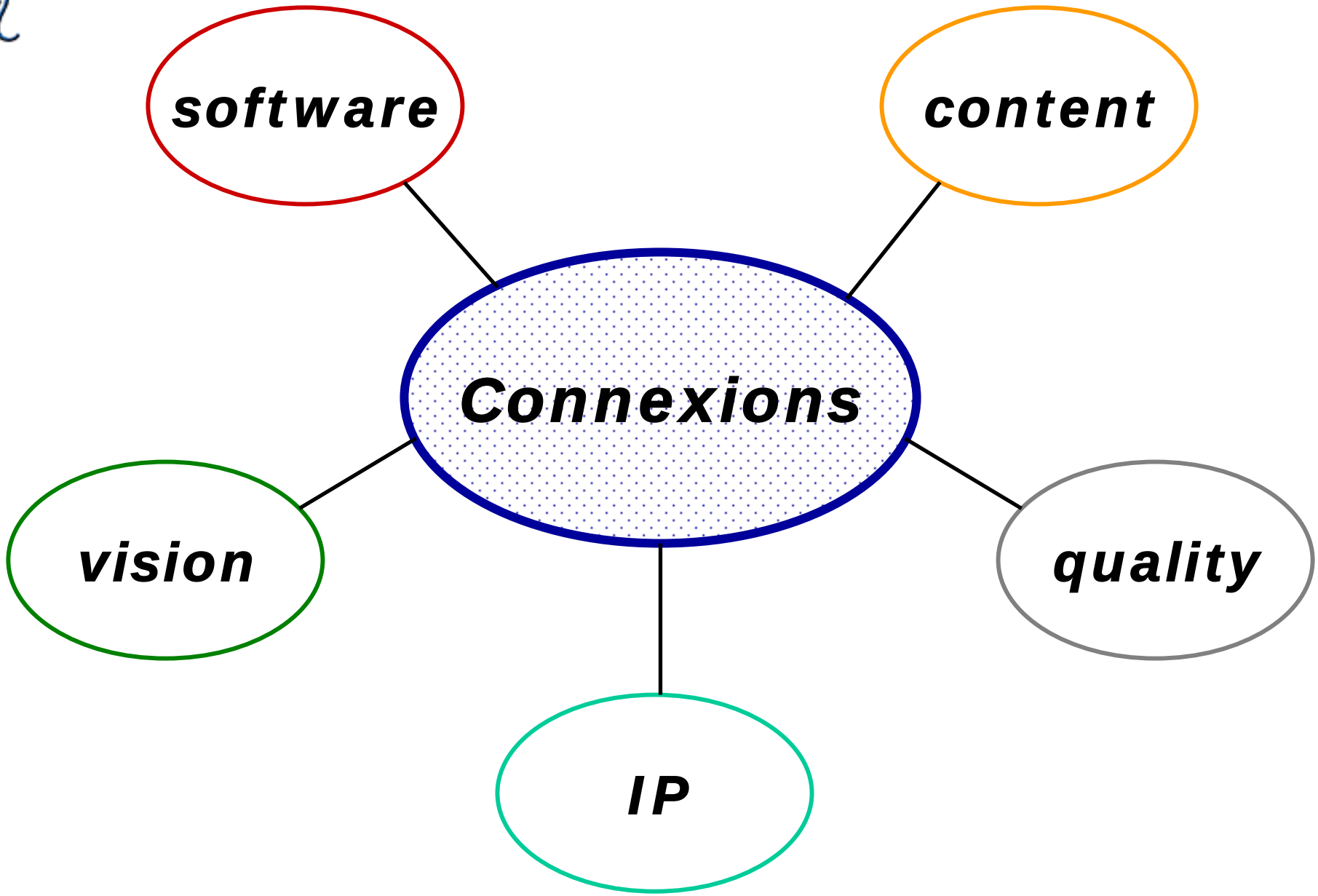
Courses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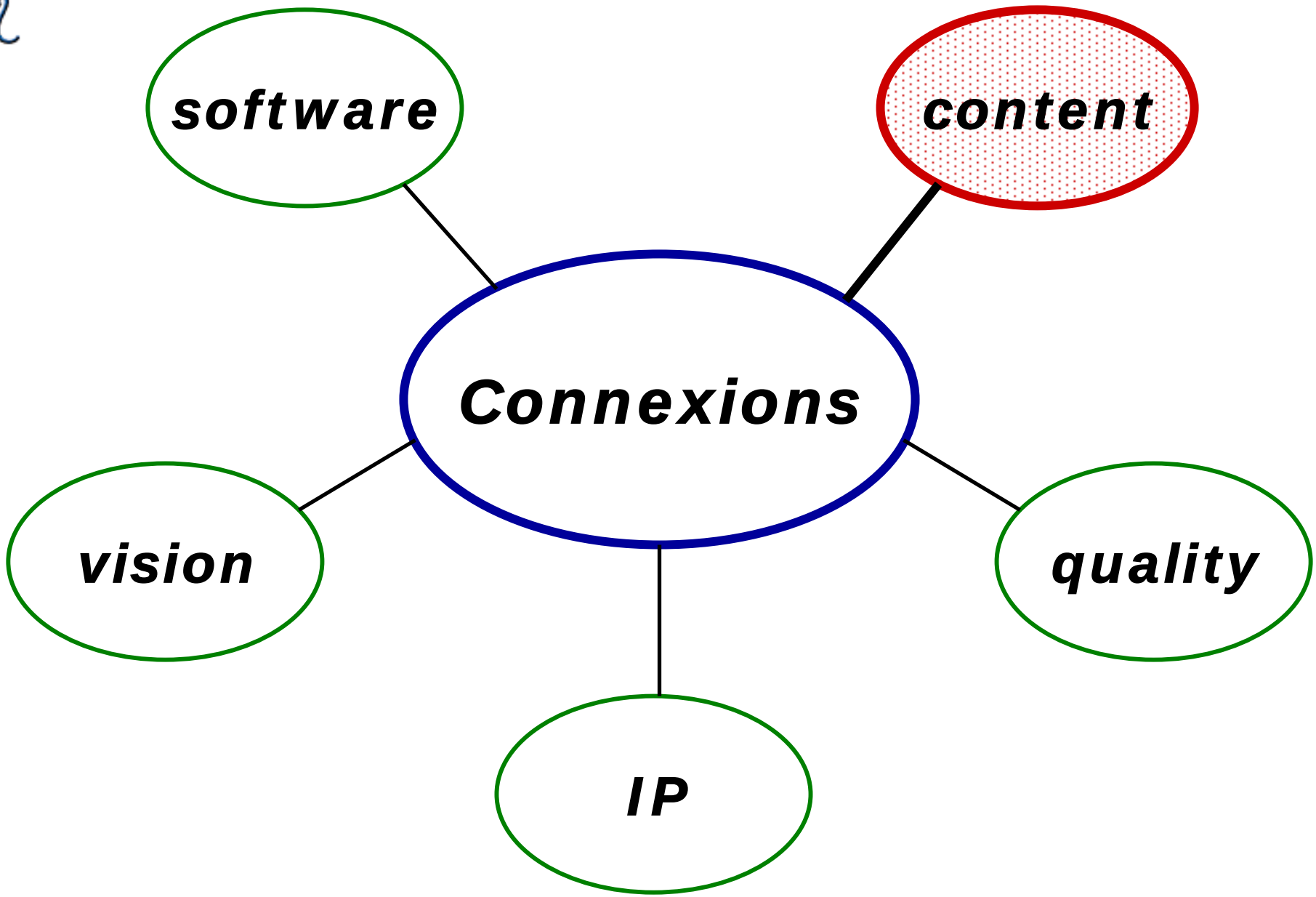
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Content Commons

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/Thunderbird, …

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

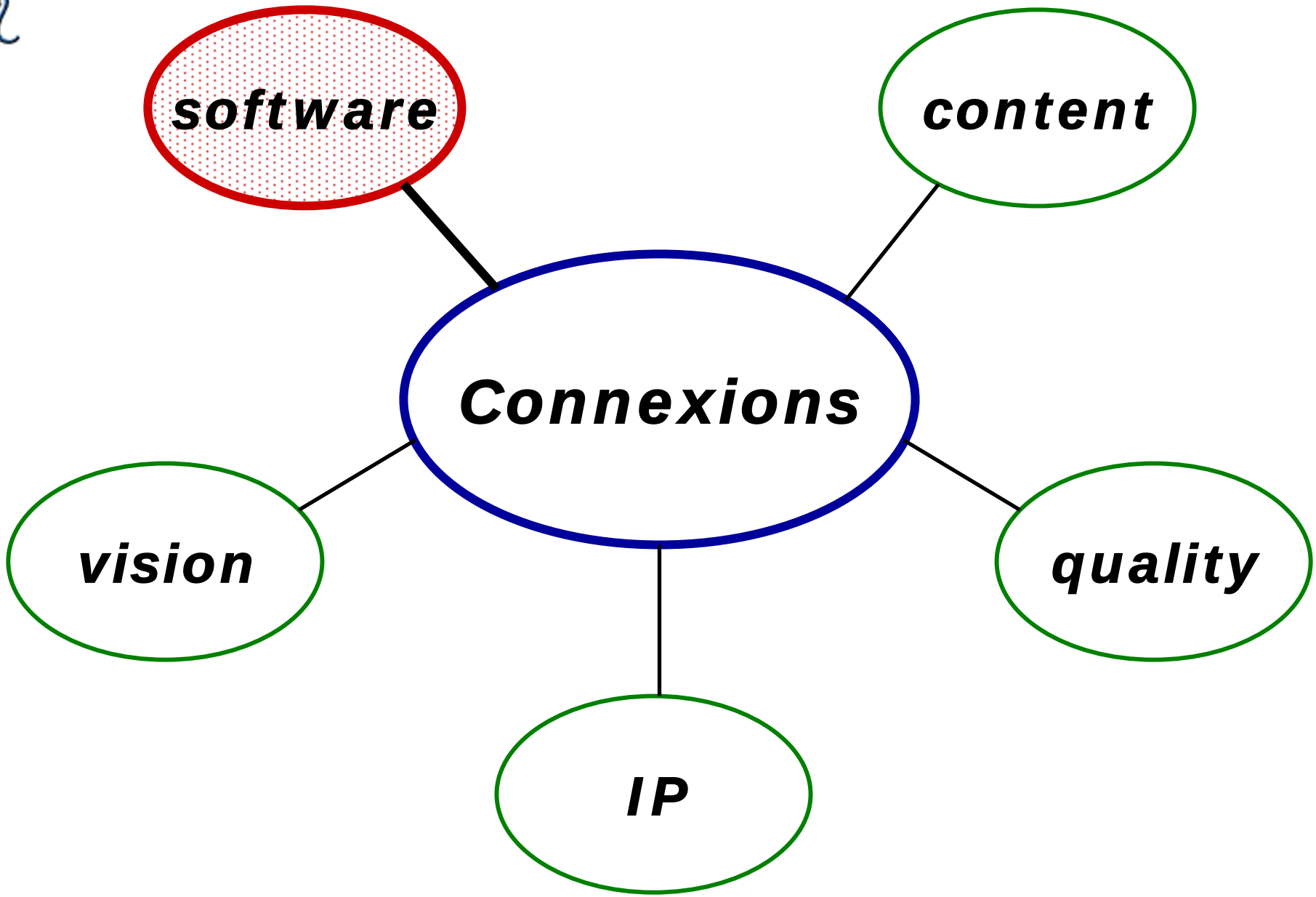
- *Dynamic – iterative refinement – evolution*
  - "close the loop" in cycle of
    - *develop* learning materials
    - *use* them for learning
    - *assessment* feedback

Enabling a Commons

1. Common cultural *vision, goals, norms*

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.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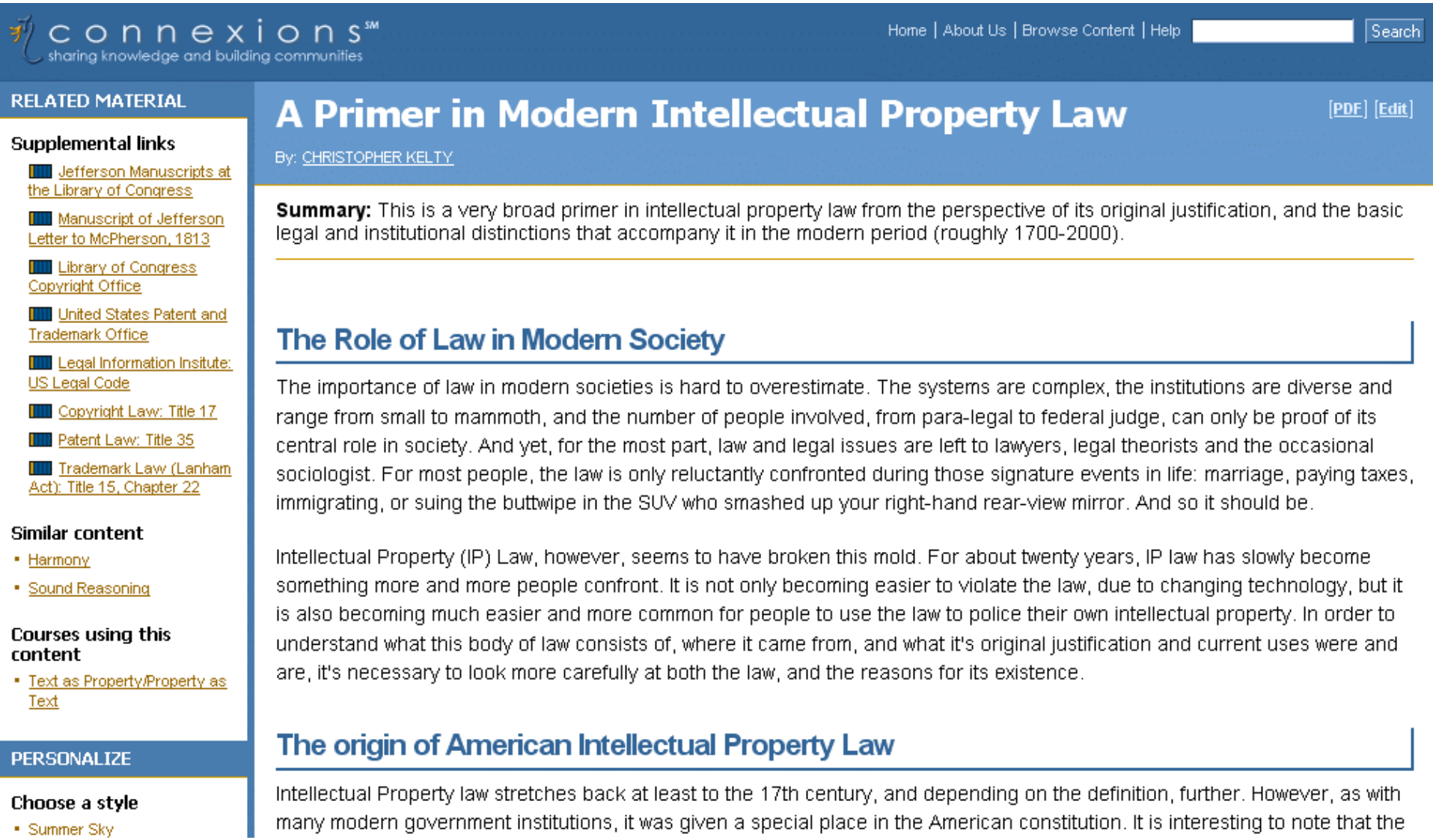
Technology and Tools

- Connexions tools: "*operating system for sharing*"
- Architecture and tools *free* and *open source*

- Content *modules* encoded in *XML*
- *Database* to organize modules (eventually distributed)
- *Authoring tools and workgroups* to facilitate collaboration
- *Course Composer* to assemble modules into courses
- *Annotation* to personalize modules
- *Roadmap* to navigate and explore
- *Discussion forums* for feedback, communication (w/ USU)
- *Lenses* – multimodal peer review system (future)

Computer Science

Intellectual Property



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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

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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

Children's Music

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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.)

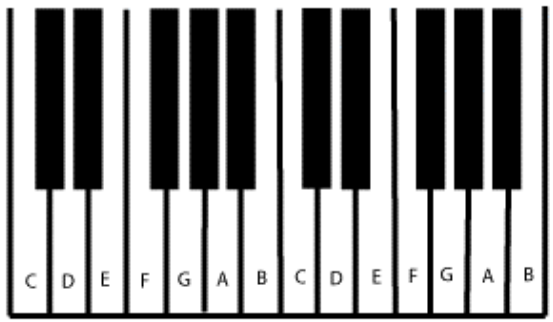

Figure 1: The natural notes name the white keys on a keyboard.

History

The Galileo Project

Galileo's Telescope

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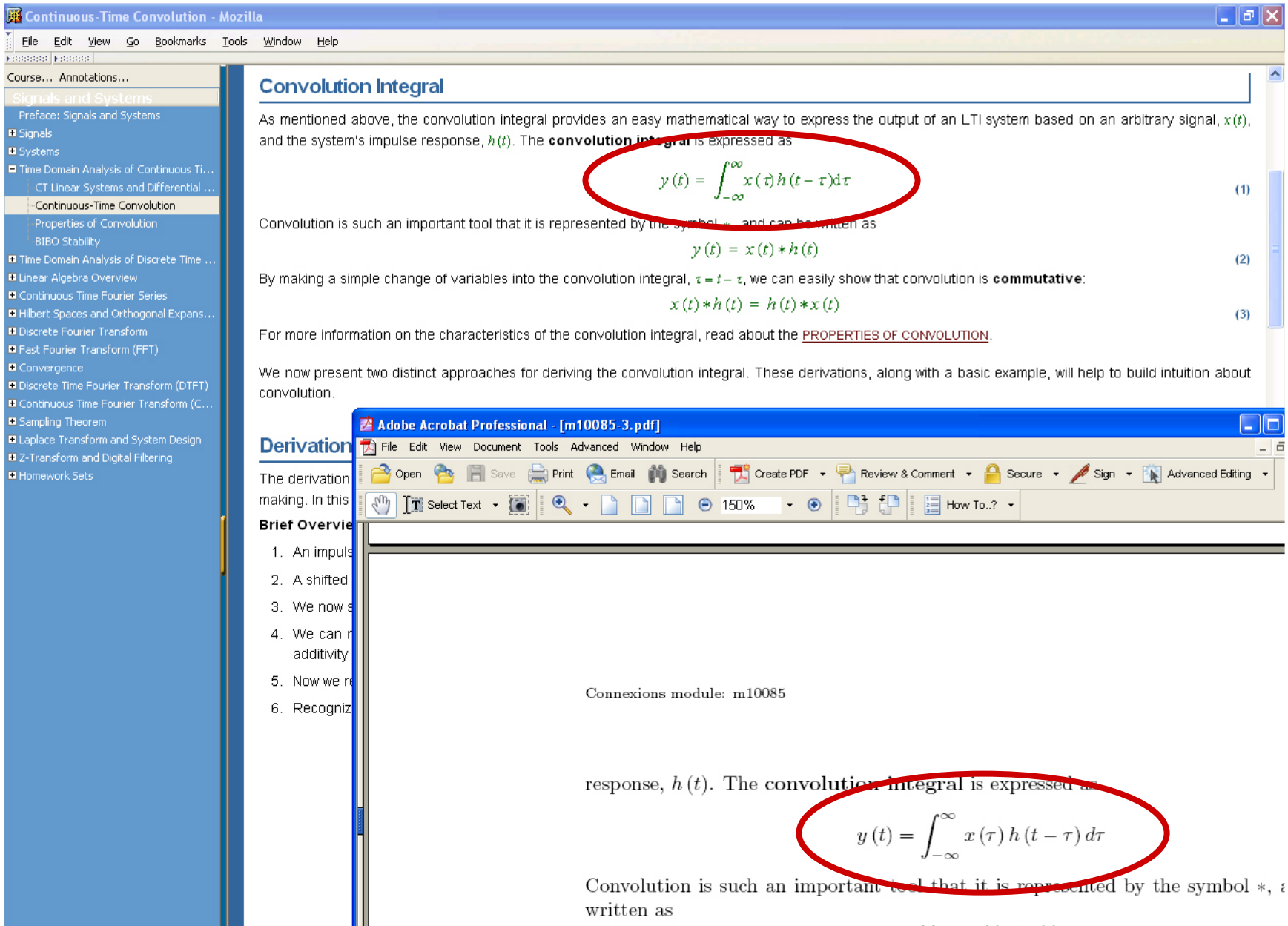
Figure 1: Johannes Hevelius observing with one of his telescopes. (Source: Selenographia, 1647)

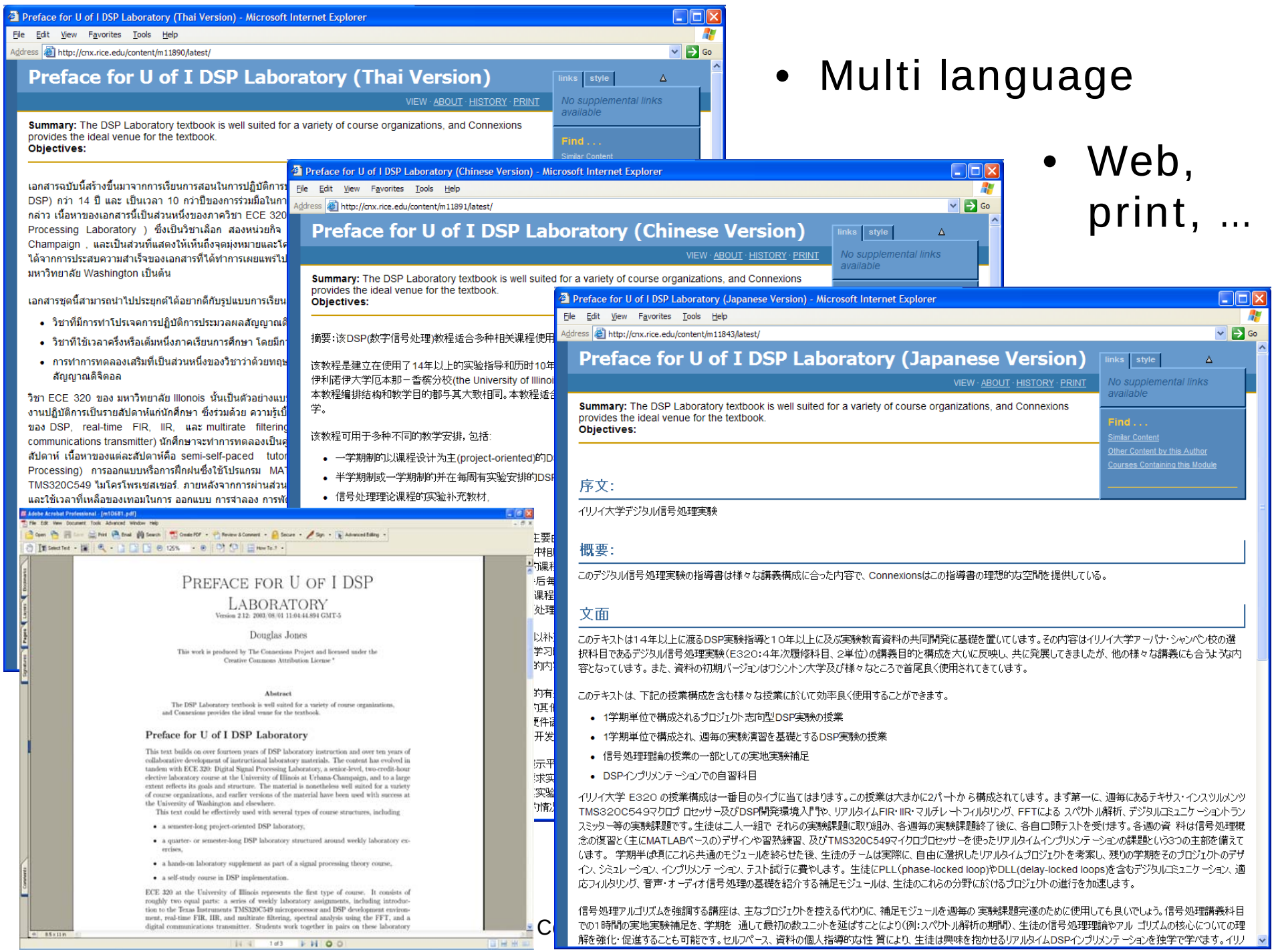
The telescope was one of the central instruments of what has been called the Scientific Revolution of the seventeenth century. It revealed hitherto unsuspected phenomena in the heavens and had a profound influence on the controversy between followers of the traditional **geocentric astronomy** and cosmology 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

Mathematics via MathML

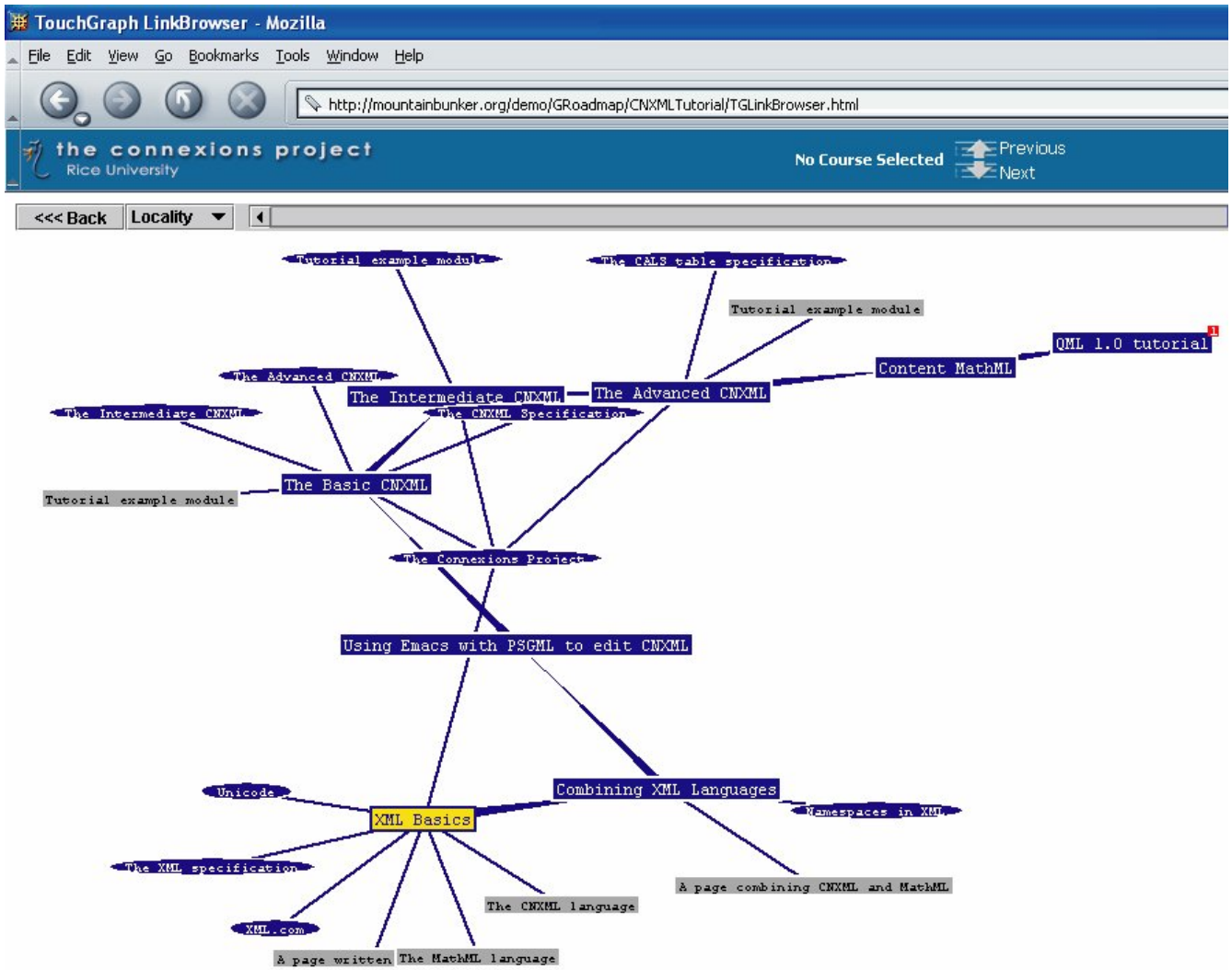


- Multi language
- Web, print, ...



Concept Navigation

- Explore the interconnections between ideas



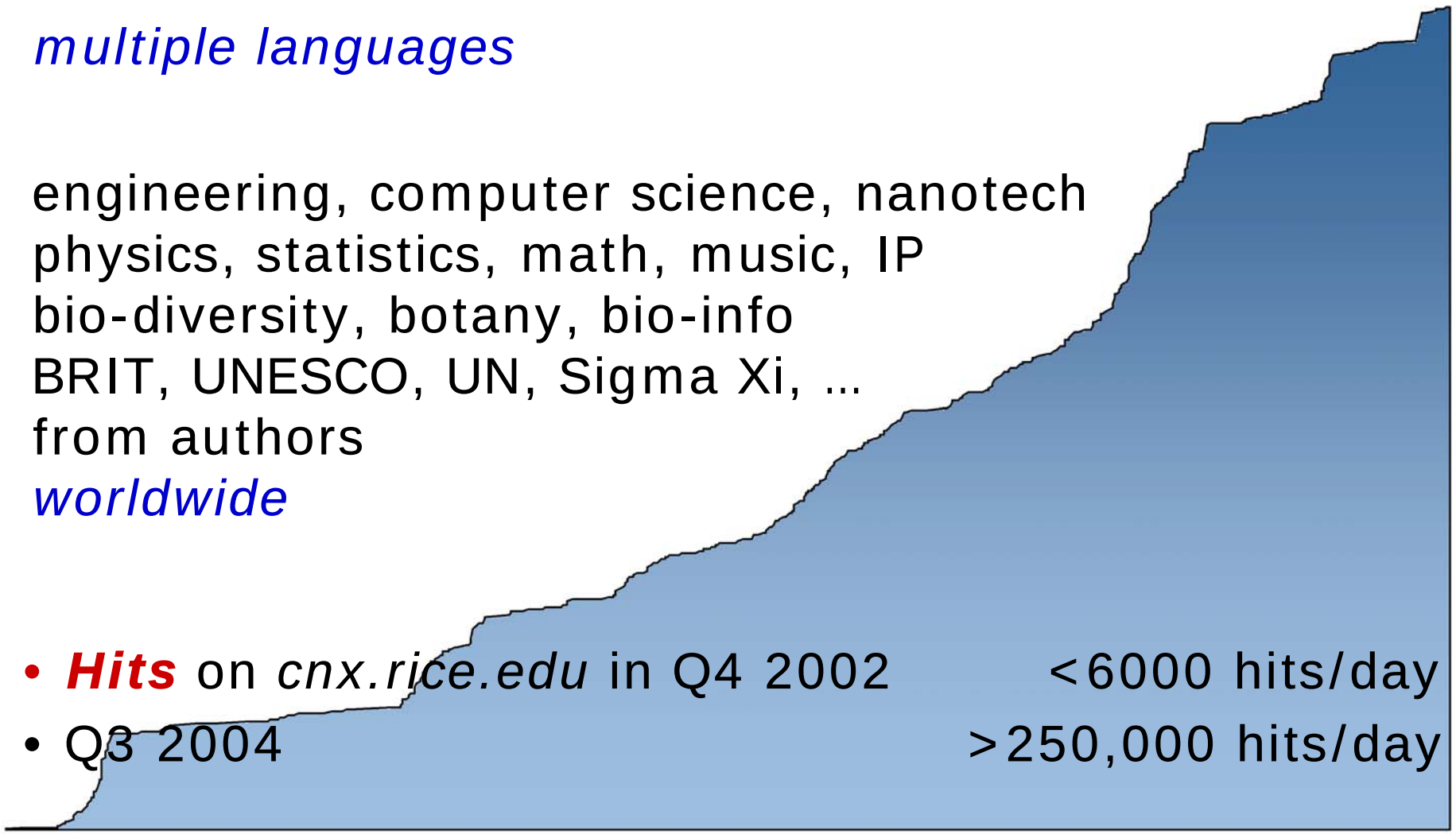
Content Commons

>2100 modules

>45 courses (October 2004)

multiple languages

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

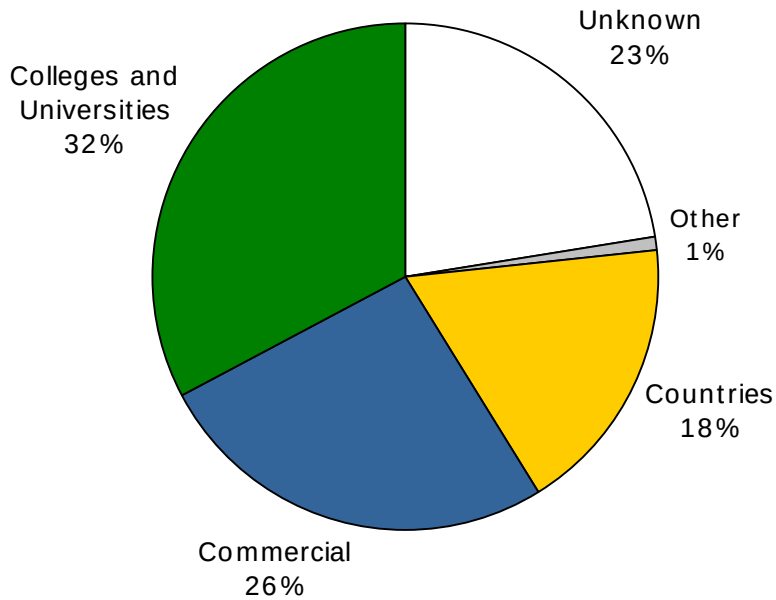


- ***Hits*** on *cnx.rice.edu* in Q4 2002 <6000 hits/day
- Q3 2004 >250,000 hits/day

Worldwide Participation

- Authors and instructors
  - 2000+ current author accounts
  - Illinois, Michigan, Ohio State, Wisconsin Georgia Tech, Polytechnic, UTEP, Rice Cambridge, Norway, Verona, …
  - students are becoming authors

- Students and other users
  - 250,000+ hits per day
  - 450,000+ “users”
  - 96% outside Rice



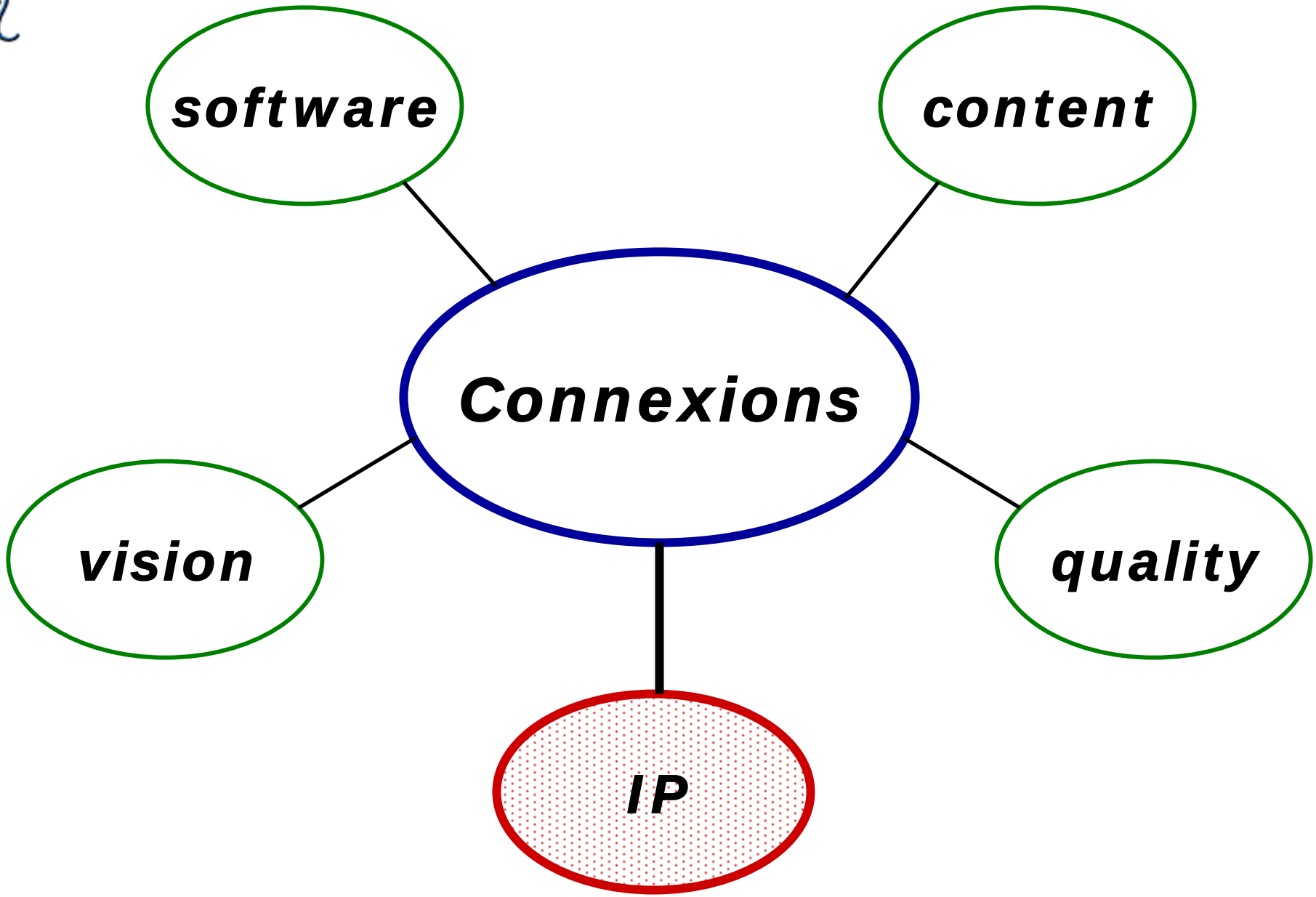
- Industry
  - Cambridge University Press UK
    National Instruments USA
    Texas Instruments Japan

Enabling a Commons

1. Common cultural *vision, goals, norms*

2. Common *technology framework*

3. Common ***intellectual property*** framework
   - role of instructor is to *interpret* and *re-contextualize* material
     - instructors continually "*remix*" materials (one-size-fits-all approach not very useful)
   - module *reuse* typically requires *modification*
   - busy faculty do not have time to chase down copyright holder (*not scalable*)
   - IP must be integrated into content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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)

  - 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

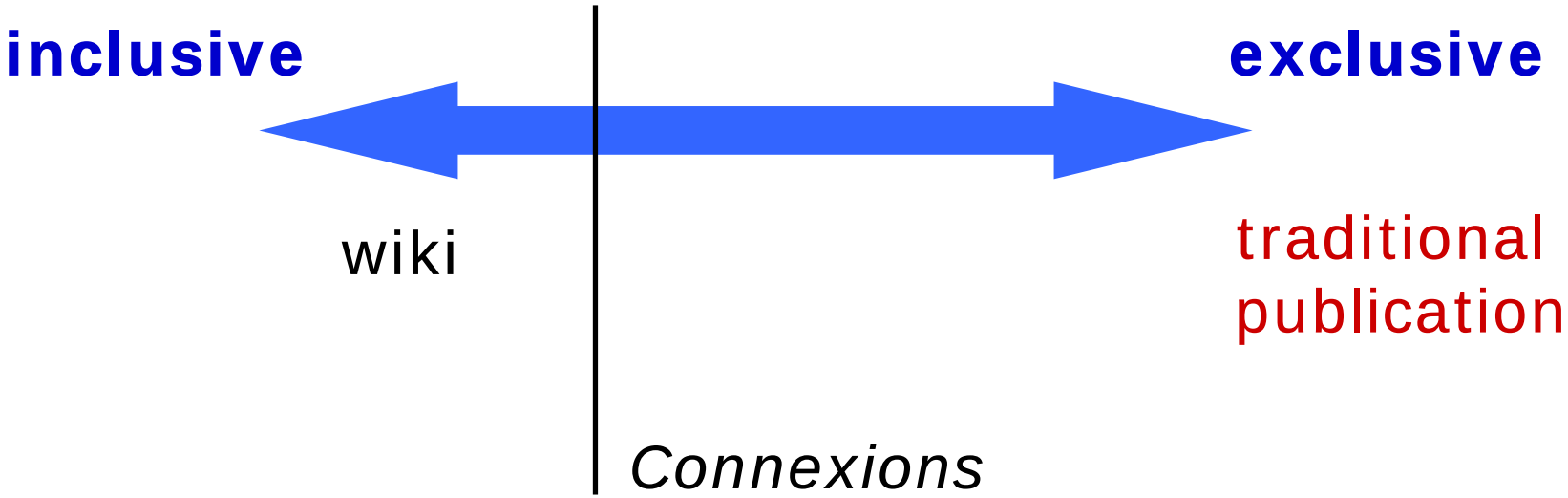
- Recent developments
  - Public Library of Science - MIT OpenCourseWare
  - Berlin Declaration (EU)
  - Peru, Brazil, Argentina, Mexico open-source initiatives
- Commercial collaborators

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

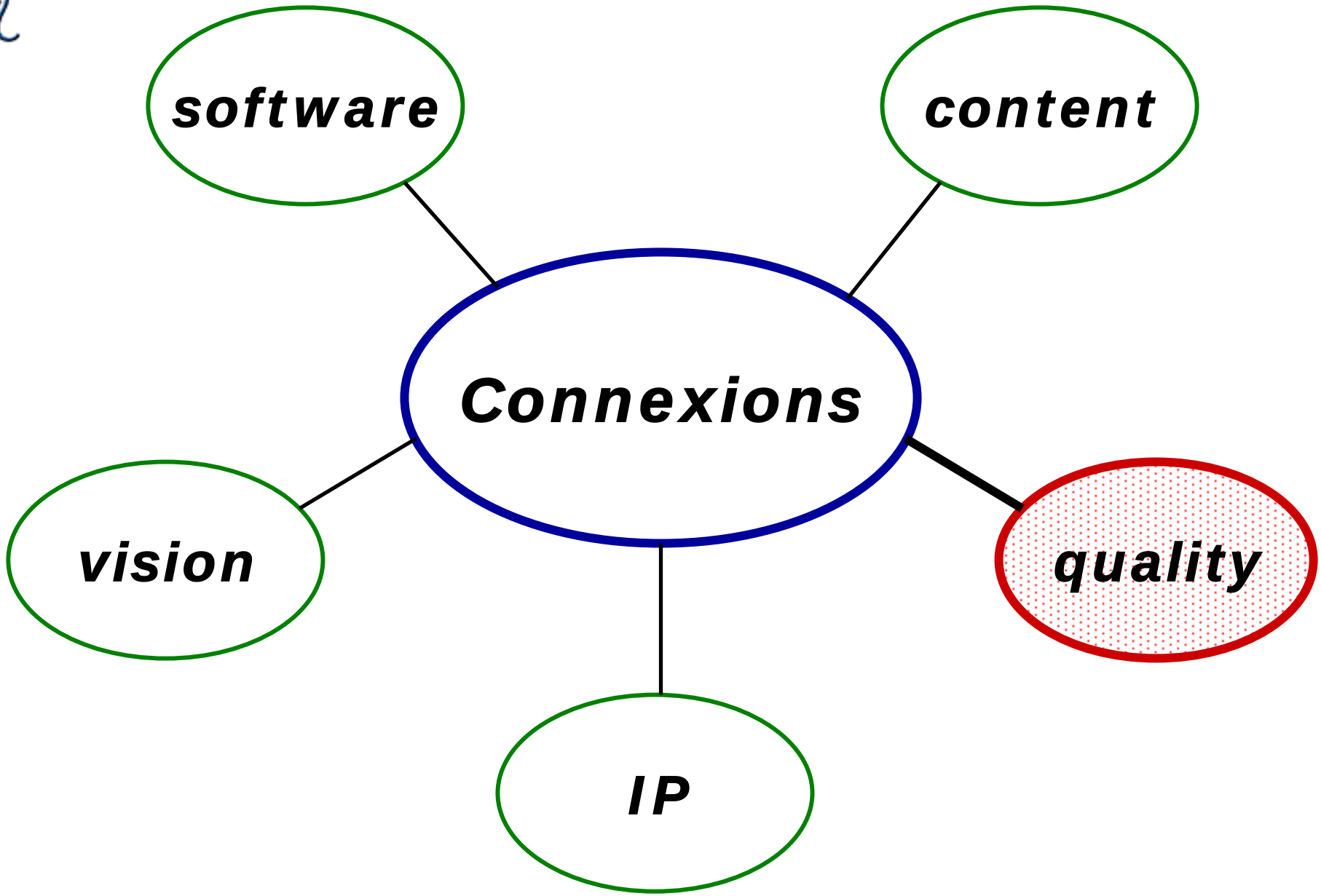
Open Access Vision

- Academics are accustomed to *sharing*
- Many authors comfortable trading *royalties* for *impact*
- But what about *control* over the content?

Authorship Continuum



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

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

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

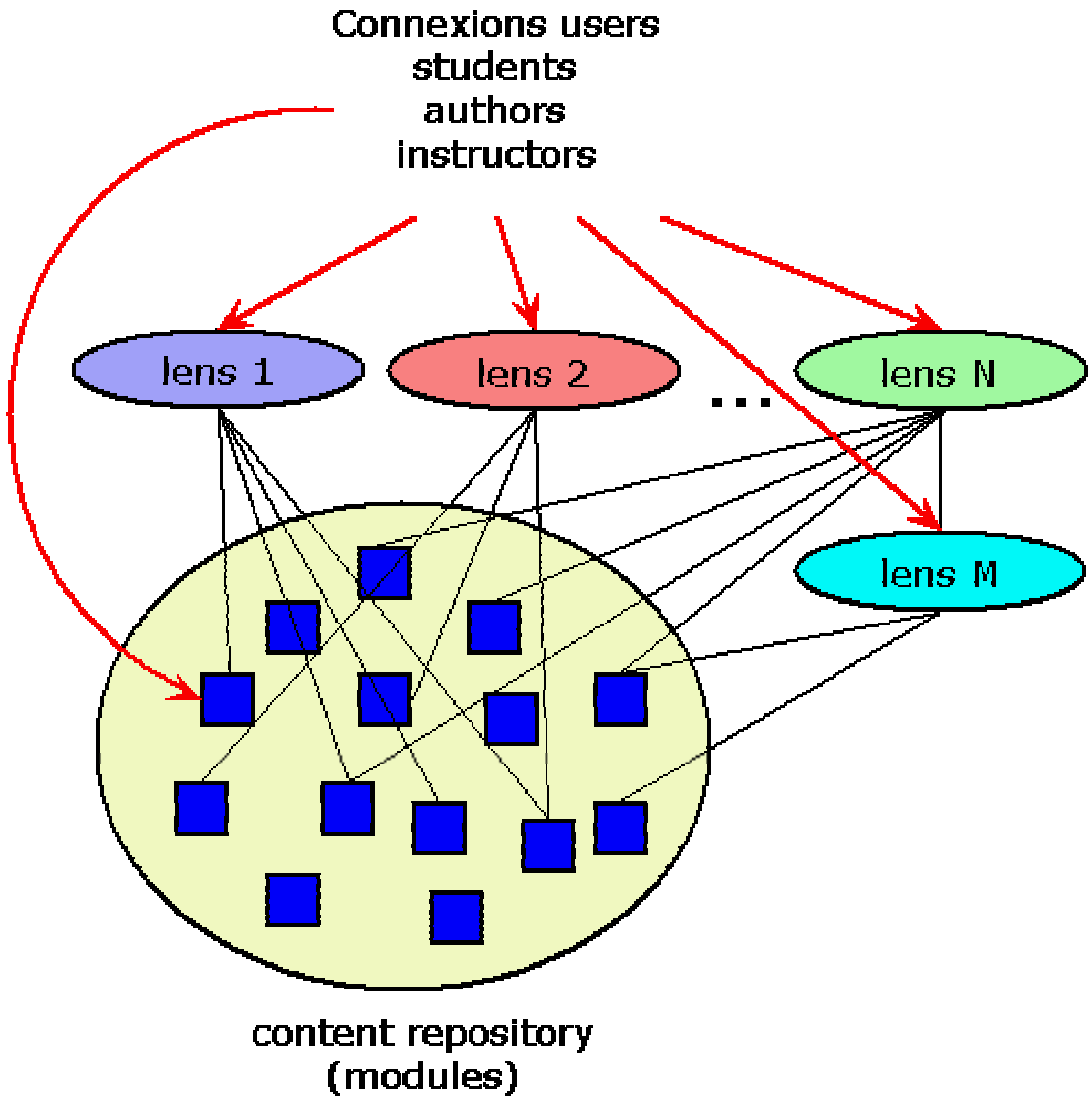
Post-publication Review: *Lenses*

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

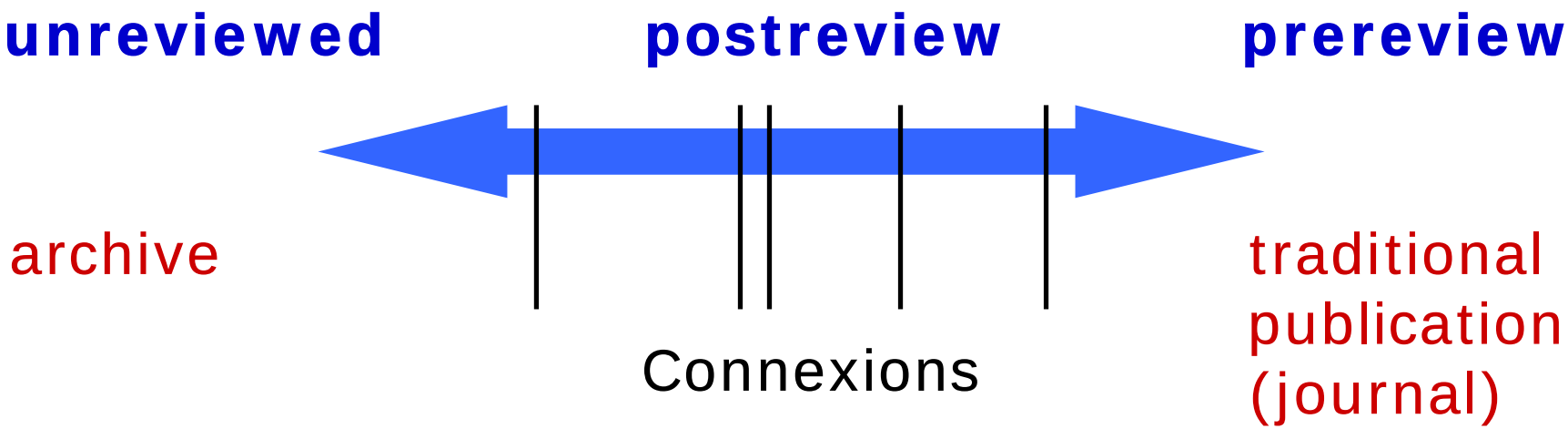
professional society
university, school board
publisher, colleagues

most popular, linked
collaborative filtering
user rating, blogs

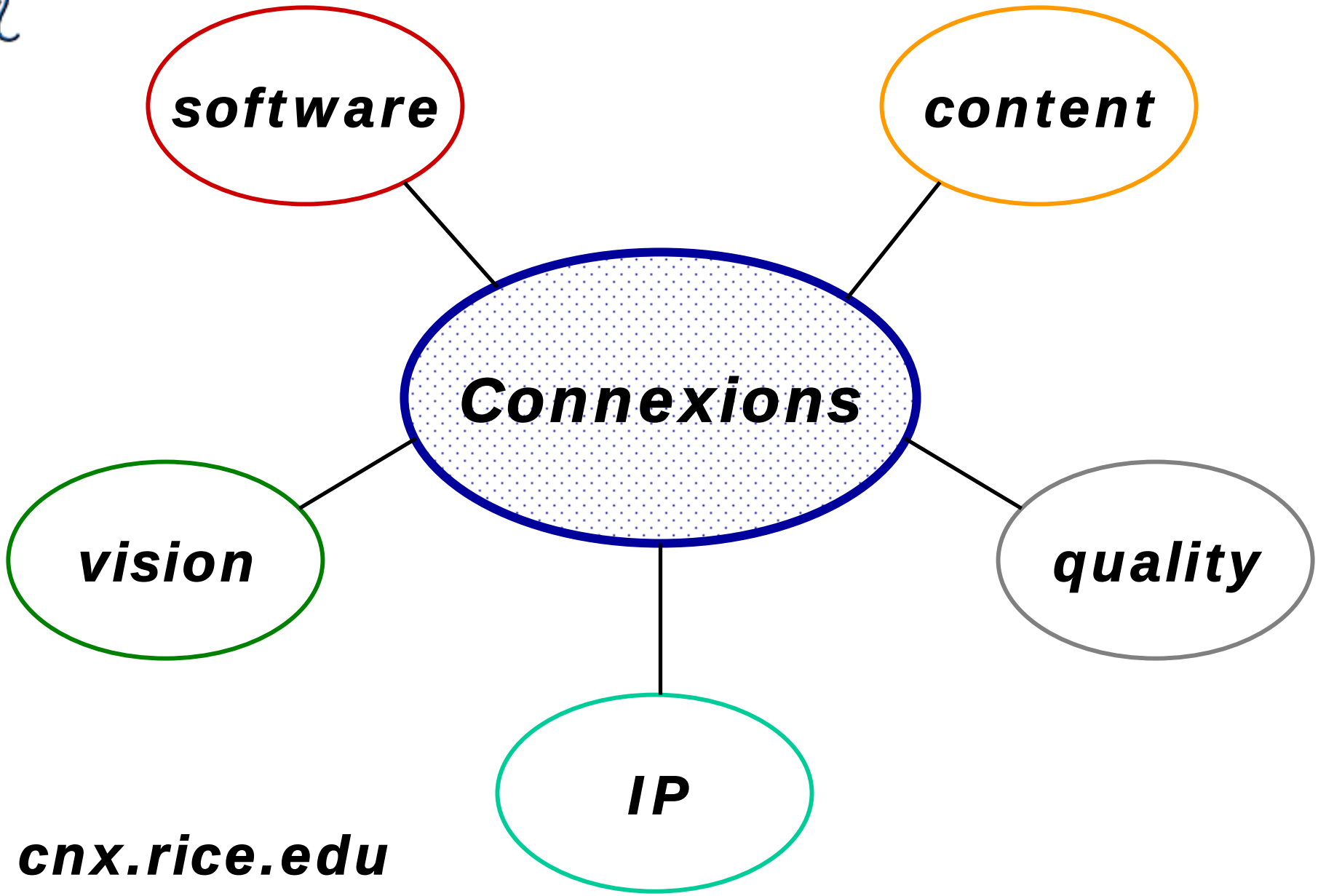
learning assessment rating



Review Continuum



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



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Summary – Opportunities

- Commons = Open access + Open contribution
  - anyone can contribute (students, K-12 teachers, public, …)
  - avoid content fragmentation after reuse
- Leverage and *extend academic culture* and enterprise globally
  - new opportunities to *interact*
  - diversity, innovation, dynamism, feedback
- *Broader impact* for teaching materials
- Connect *content* with *context*
- Fully exploit multimedia content
- Support emergence of *new disciplines*
  - nanotechnology, bioinformatics, complex systems…

Summary – 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?
  - how to involve in promotion and tenure?
- *Tools*
  - must be open, easy to use, and intuitive
  - design cannot ignore social issues
  - *beware of the chasm!*

Plan and Timeline

Proof-of-Concept Phase 1999-2004

- Release 1.0 (February 2004)
  - robust, supported system in use worldwide
  - collaborative authoring, roadmap, annotation, publishing, …

Build-up Phase 2004-2007+

- expanded outreach, training to support *grassroots dev*.
- enhanced tools to promote *scaling*
- Release 2.0
  - open-source WYSIWYG XML editor; MS Word converter
  - additional IP license support
- Release 3.0
  - distributed data bases, more IP license options, increased language support, lenses, stronger functionality for specialized domains

Sustainability Phase 2007+

- *support* infrastructure
- potential non-profit "*dot-org*"

Connexions is open to you!

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