Open Textbooks

An Author's Perspective

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Pacific University
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The Problem

Textbooks Today

- Textbooks are too expensive
- Frivolous new editions are disruptive
- Publishers consolidate and worthwhile books go out of print
- Content designed for widest possible audience

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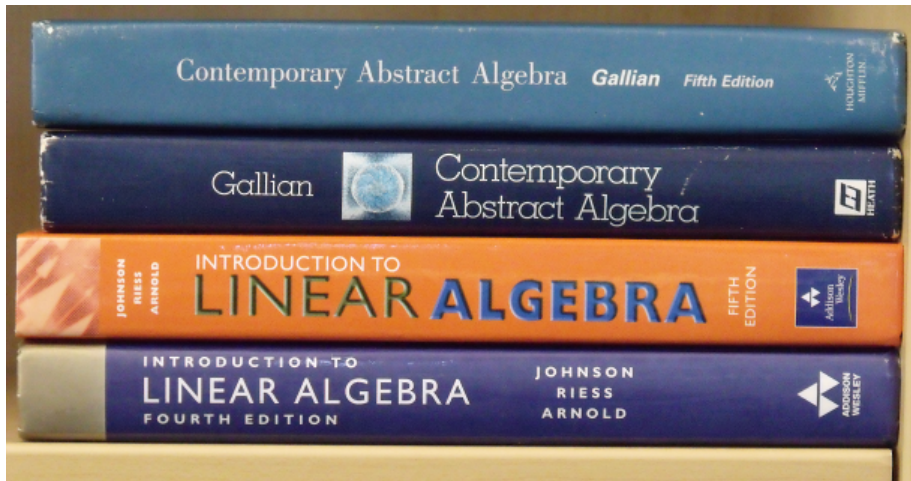- Content designed for widest possible audience

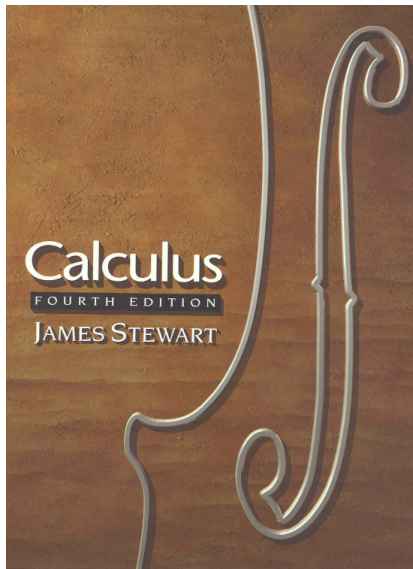> Commercial interests have been given too much influence.

My Bookshelf

Thirty books with enough content to make five.

My Bookshelf

Linear Algebra: 1st Edition, 1981. 6th Edition, List: $145.33
Abstract Algebra: 1st Edition, 1984. 7th Edition, List: $169.95

Stewart's mansion in Toronto
18,000 ft^2, \$24 million

6th Edition, List: \$213.95

Last Week's Email

I'm teaching discrete mathematics next semester. I have loved using Scheinerman's "Mathematics: A Discrete Introduction" for this course. However, I am now balking at the price. I have looked at other books out there, and either they don't really seem to fit the needs of our course as much as Scheinerman's book does, or there seems to be no appreciable price difference.

A Solution

Open Textbooks

- Free download, or very inexpensive to print
- New editions have new content
- Never go out-of-print
- Intellectually honest approach to a subject

Open Textbooks

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> Open textbooks allow a return to a free exchange of ideas.

An Open Textbook

Birth of a Text

Why does one decide to write a textbook?

Birth of a Text

Adolescence

- Spring 2004: Half of a semester's sabbatical
- Wrote half of the narrative
- August 2004: Website debuts
- Fall 2004 Semester: wrote second half of narrative
- December 2004: Open license, TEX source available
- Taught the course frequently in subsequent semesters

Age of Majority

- December 2006
- Online MathML/XML version
- Version 1.00
- Print-on-demand available at Lulu.com

Early Adulthood

- Spring 2007: Advanced Topics course, new chapters
- Two students write sections
- Frequent corrections from readers worldwide
- In use at. . .
  - ▶ Smith College
  - ▶ Amherst College
  - ▶ Pacific University
  - ▶ U of Colorado
  - ▶ U of Western Australia
  - ▶ Central Washington U
  - ▶ Miramar College
  - ▶ Wilbur Wright College
  - ▶ Moorpark College

"A Dizzying Array of Formats" — Textbook Revolution

Two major editions, nine minor revisions (semesters), countless updates
Automated construction from one source:

- Archive (zip, tar) with LaTeX source
- PDFs for download
  - ▶ A4 and Letter, 1-sided, 2-sided, "electronic"
  - ▶ Screen ratios, 4:3 and 16:9 widescreen
  - ▶ Sony Reader, Kindle DX
- MathML/XML (needs fonts), jsMath (fonts on server)
- Flashcards of definitions and theorems, supplements
- Detailed change log
- Planned: Sage worksheets

Eleven revisions, plus recent updates, always available

Distribution

- Print on Demand at Lulu.com
- Amazon Honor System donations (broken)
- Website
  - ▶ linear.pugetsound.edu
  - ▶ 500,000 page views ($\sim$ 250,000 visitors)
  - ▶ Worldwide audience (statcounter.com)
  - ▶ #6 for Google "linear algebra" search
- RSS feed (with PDF enclosure)
- Twitter: @FCLAbook, 16 followers
- Discussion group on Google Groups: fcla-discuss

Advantages

- Free download
- Print copies, 900 pages, softcover at $\sim$\$30
- The book has its own freedom (having reached the age of majority)
- Never goes out of print
- Old editions always available
- Extremely customizable
  - ► Remove chapters, exercises
  - ► Solutions in each section, or all in the back
  - ► Notation: A^t versus $\overline{A}$
  - ► Example: Nancy Neudauer, Pacific U
- Hyperlinks from proofs to previous theorems
- MathML/XML readable for blind

Demonstration

Demonstrate PDF, jsMath versions

Frequently Asked Questions

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  - ▶ Doubtful.
- That's very admirable, have you made much money?
  - ▶ No, not really, but I do receive donations (and lots of great email).

A Publisher's Perspective

Open Textbooks

Choosing an Open Source Text

- PIRG's Affordable Textbook Campaign
  - ▶ "Open Textbooks Statement of Intent"
  - ▶ 2,000 signatures
- There was no decent, truly free, abstract algebra textbook
- Tom Judson's "Abstract Algebra; Theory and Applications"
- Original publisher: PWS-Kent, 1992

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- Two fortunate circumstances
  - ▶ Copyright was returned to Judson (he has a letter)
  - ▶ Book was written in LaTeX, PDF production was trivial

Quick Acceptance

- Website debuts February 2009
- abstract.pugetsound.edu
- LATEX source, PDF close to original
- 17,000 visitors
- In use at seven schools this fall
  - ▶ U of Portland
  - ▶ U Puget Sound
  - ▶ Berkeley
  - ▶ Grinnell College
  - ▶ Drexel U
  - ▶ Virginia Commonwealth U
  - ▶ Boston College
- Available on amazon.com via the Virginia Commonwealth series
  - ▶ $25 hardback, delivered in 4 business days

How Libraries Can Help

The Two Minute Explanation (Faculty)

- Copyright is a government-granted monopoly
- This allows me to use a license granting extra freedoms
- FREE
- No spurious editions, no out-of-print
- Flexible: copy, modify, chop, extend, hack, remix

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Encouraging Authorship (Authors)

- What did you do with your last research publication?
- Do you think your subject could be presented better?
- Do you want to enhance your prestige?
- Do you like deadlines?

Choosing a License (Potential Authors)

- GNU Free Documentation License (GFDL)
  - ► Free to copy, modify, distribute
  - ► Modify and distribute, then must use GFDL
  - ► Same license as Wikipedia

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- Creative Commons
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  - ▶ NC makes Judson on Amazon impossible
  - ▶ NC makes FlatWorld Knowledge possible

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  - ▶ NC makes FlatWorld Knowledge possible
- Threat of a "fork" keeps authors honest
- Possibility of a fork gives faculty and students assurances

Bait and Switch

Thomas S. Shores, *Linear Algebra and Applications Textbook*
Website, July 29, 2009:

> *In order to enable prospective users to preview my text easily and
> conveniently, in the past I have put a copy of it on the web for
> your perusal. In the last few years I've received many helpful
> comments and appreciative notes for having done so. I would like
> to thank those of you who sent me these notes and comments.
> You have helped me substantially improve the text. I am now
> under contract with Springer-Verlag and the book has been
> published in their Undergraduate Texts in Mathematics series in
> hardbound and, more recently, soft cover editions. Therefore, I
> have removed the on-line copy.*

Locating Quality Open Textbooks (Faculty, Students)

Last week's email continued

I searched for some freely distributable books, but I clearly didn't know where to be looking or how to search. So I thought I'd go to the most knowledgeable person I know about such matters. Do you know of any discrete math books that are available freely or cheaply on the web? I want to emphasize that, at this point, I am driven purely by the cost, and not by thoughts of collectively writing an ideal book or any such.
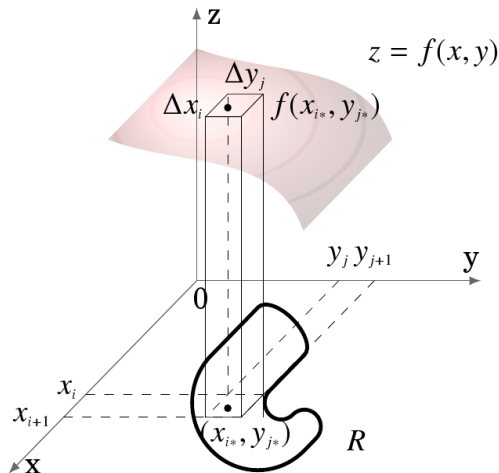
Locating Quality Open Textbooks (Faculty, Students)

- How do you find open textbooks?
  - ▶ Google "free textbook ⟨your-subject-here⟩" (not always open)
  - ▶ Textbook Revolution, subject-specific lists
  - ▶ MERLOT, Connexions, MIT OCW
  - ▶ Many students use my book to augment a course's choice
  - ▶ This can be a very hit-or-miss proposition
- How to choose a book
  - ▶ This requires much more work than with a "traditional" book
  - ▶ The Assayer, Community College Open Textbook Collaborative
  - ▶ It is hard to find more that just capsule reviews
  - ▶ Advice: look for an author at a similar institution

Technical Services (Authors)

- Software for authoring
- Formats for electronic distribution, online viewing
- Print-on-demand services
- Design of a book (frontmatter, index)
- ISBN, Books in Print, retail distribution, etc
- Page layout, cover design
- Graphics — for technical books
- Rights permissions — graphics in a history text

Graphics for calculus in 3 dimensions

(b) Parallelepiped over a subrectangle, with volume $f(x_{i*}, y_{j*})\, \Delta x_i\, \Delta y_j$

Michael Corral's
Vector Calculus
GFDL License

Campus Culture (Administrators)

Can you help create a campus culture that values:

- Textbook writing
- Independent, open publication

The Book as Software

Parallels to open-source software development:

- "Scratching one's own itch"
- Enhance your reputation through contributions
- "Release early, release often"
- "With many eyes, all bugs are shallow"
- "Come for the price, stay for the quality"
- "Triumph of the commons"

See the essay: "Books as Software"
http://www.cs.brown.edu/∼sk/Memos/Books-as-Software/

Shriram Krishnamurthi
Programming Languages: Application and Interpretation
Creative Commons A-NC-SA License

The Future

Where From Here?

- Many more faculty "get it"
- . . . but need better information
- Governments are stepping in
  - ▸ Sen. Durbin (D-IL), Open College Textbook Act
  - ▸ Washington State's State Student Completion Initiative
- New disciplines (beyond science, business/economics)
  - ▸ Imagine an anthology of poetry or short stories

What's Needed?

- A change in campus attitudes
- Progress with textbook committees
  - ▶ Adoptions in multi-section courses (mostly Lone Rangers now)
  - ▶ More books for high-impact courses (algebra, calculus)
- More, and more thorough, reviews
- A Good Housekeeping Seal of Approval?

- Technical, legal, design assistance for authors
- Better collections, catalogs, search for faculty

Conclusion

A Prescient Quote

If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature...

Thomas Jefferson, Letter to Isaac McPherson, August 13, 1813

Conclusion

I am more convinced than ever, it is only a matter of time and education.

Posted at http://buzzard.pugetsound.edu/talks.html