Open Textbooks
From an Author’s Perspective

Rob Beezer
beezer@ups.edu

Department of Mathematics and Computer Science
University of Puget Sound

Washington State Board
for Community & Technical Colleges
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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

Commercial interests have been given too much influence.
My Bookshelf

Thirty books with enough content to make five.
My Bookshelf

Stewart’s mansion in Toronto
18,000 ft², $24 million

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 allow a return to a free exchange of ideas.
My Bookshelf

Can you spot the open textbook?
My Bookshelf

Can you spot the open textbook?
Birth of a Text

Why does one decide to write a textbook?

Rob Beezer (U Puget Sound)
Example A

### Bigger Systems

1. \( x - y + 2z = 10 \)  
2. \( 2x + y + z = 5 \)
3. \( 5x + y - 2z = 0 \)

**Unique**

Example B

1. \( x - y + 2z = 10 \)
2. \( 2x + y + z = 5 \)
3. \( 3x + 10y = 0 \)

\( (1, -1, 4) \)  
\( (1, 0, 2, 7) \)  
\( (0, 0, 5) \)
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 \texttt{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 (~ 250,000 visitors)
  - Worldwide audience (statcounter.com)
  - #6 for Google “linear algebra” search
- RSS feed (with PDF enclosure)
- Twitter: @FCLAbbook, 23 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
Choosing a License

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

- **Creative Commons**
  - BY, SA, NC
  - NC makes Judson on Amazon impossible
  - NC makes FlatWorld Knowledge possible

- Threat of a “fork” keeps authors honest
- Possibility of a fork gives faculty and students assurances
The License is Important

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.*
Demonstration

Download a PDF version
View the online jsMath version
http://linear.pugetsound.edu
Frequently Asked Questions

- Is it an online course?
  - No, it is a “real” book, distributed online.
- (Upon seeing physical copy) Oh, it is a real book!?
  - Yep, it is a real book, only better.
- Do you have a publisher yet?
  - I am the publisher.
- Have you finished?
  - Never.
- How many deadlines have you missed?
  - None.
- Is it copyrighted?
  - Yes, do you understand copyleft?
- That’s very admirable, but don’t you want to make money?
  - Yes, I’m trying.
- That’s very admirable, but couldn’t you make lots of money?
  - Doubtful.
- That’s very admirable, have you made much money?
  - No, not really, but I do receive donations (and lots of great email).
Adopting 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
  - Bought by Wadsworth
  - Bought by Thomson
  - Sold off as Cenage Learning

- 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
Conclusion: The Two-Minute Elevator Speech

- 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

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