The Evolution of Affordable Content Efforts in the Higher Education Environment: Programs, Case Studies, and Examples
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Contents

Reviews viii
Acknowledgements x

The Evolution of Affordable Content Efforts in the Higher Education Environment 2

Chapter 1 - Introduction to The Evolution of Affordable Content Efforts in the Higher Education Environment

Individual Courses

Chapter 2 - Accessing Science through an Online Database: A Comparison of Student Learning and Engagement Using Library Database Readings as a Textbook Alternative 10
Mary Ann Cullen, Dion Stewart, and C. Bayard Stringer

Chapter 3 - Faculty-Library Collaboration in a Course Without Assigned Textbooks 23
Lauri DeRuiter-Willems and Stacey Knight-Davis

Chapter 4 - Internationalizing the Curriculum: Area Studies Collections and Affordable Content Programs 38
Pamela Espinosa de los Moneros

Library Ebook Affordable Content Programs

Chapter 6 - Beyond OER: Library Licensed E-Books as a Proactive Course Reserves Model and Collections Development Tool 49
Victoria Raish, Chris Holobar, and Kathy Hightbaugh

Chapter 7 - Textbook or Not: How Library Ebook Purchasing Power Aligns With Curricular Content Trends 61
Niamh Wallace and Sara Filion

Students and Affordable Course Content

Chapter 5 - Student Feedback on Affordable Content in the Classroom at the University of Minnesota 73
Kristi Jensen
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Creating Affordable Content Programs

Chapter 8 - All Hands on Deck: How One University Pooled Resources to Educate and Advocate for Affordable Course Content 93
Lucinda Rush, Leo S. Lo, M’hammed Abdous, and Deri Draper
Chapter 9 - Creating an OER Toolkit: Offering Customized Solutions and Reducing Barriers in a Small Liberal Arts College
Ron Joslin, John Meyerhofer, Angi Faiks, and Teresa Fishel

Chapter 10 - Encouraging a Yes: Effective Institutional OER Initiatives
Nicole Finkbeiner, Daniel Williamson, Richard Baraniuk

Chapter 11 - Evolving Supports for Faculty to Embrace, Adopt, and Author OERs
Kimberly Johnson and Karen Pikula

Chapter 12 - Expediting OER on Campus: A Multifaceted Approach
Devin Soper, Lindsey Wharton, and Jeff Phillips

Chapter 13 - Facilitating Culture Change to Boost Adoption and Creation of Open Educational Resources at the University of North Dakota
Stephanie Walker

Chapter 14 - Let’s Begin at the End: How a Campus Bookstore Closure Set the Wheels in Motion for a Hybrid OER Project
Jonas Lamb (Attribution)

Chapter 15 - The Open and Affordable Course Material Initiative at Penn State
Julie Lang, Joseph A. Salem, Jr., and Jennifer Sparrow

Affordable Content Models

Cheryl Cuillier

Chapter 17 - Commercial Content Doesn’t Have to be Expensive
Brad Zurcher

Chapter 18 - Indiana University's Affordable E-text Model and Strategies to Increase Impact Beyond Savings
Serdar Abaci and Anastasia S. Morrone

Chapter 19 - Building on History: Providing Affordable Course Content at the University of Wisconsin-Stout
Robert L. Butterfield

Chapter 20 - University of Wisconsin - River Falls: A Textbook Rental and Hybrid Approach to Instructional Content
Amanda Moeller and Cory Whipkey

Chapter 21 - The Role of the Independent College Bookstore in Providing Affordable Course Material
Marguerite Stocker

Creating and Publishing Openly Licensed/Open Access Content

Chapter 22 - Open and Inclusive Education – Connections to Universal Design
Kaela Parks

Chapter 23 - Valuing Open Textbooks: Derivatives, Adaptation, and Remix
Anita Walz
Chapter 23 - Valuing Open Textbooks: Derivatives, Adaptation, and Remix

by Anita Walz, Virginia Tech (bio)

Introduction

In 2014, amidst excitement about the promise and possibilities of open licenses, I began supporting a project at Virginia Tech to customize and remix an existing openly licensed textbook. It sounded easy at the time, which, in retrospect, was good, for otherwise I may have never taken the opportunity to learn what it takes or how to make it easier.

To many readers, instructors, and students, open educational resources (OERs) are equivalent to freely available texts, simulations, or images, valued primarily because they provide student or institutional cost savings or because they offer free worldwide access (digital divide issues aside). OERs are, however, more than free resources. This chapter considers the potential of OERs beyond free access, looking at remix, adaptation, or creation within and outside of the classroom. I discuss the differences between in-copyright affordable resources and freely available, sharable, and editable OERs, highlight the value in adapting and resharig openly licensed content, and look at the process of creating derivatives, remixing, and adapting. I also review a paradigm for thinking about producing openly licensed textbook-like publications, and offer observations on technology solutions and some common pitfalls to avoid.

Definitions

U.S. Copyright law recognizes the exclusive rights of copyright owners to make verbatim copies, create derivative works, share copies/derivative works, perform, publicly display, and electronically transmit verbatim copies/derivative works (U.S. Copyright law). Free redistribution of copyrighted works, in whole or in part, is allowed by U.S. Copyright under private agreement or permission, and in limited situations called exemptions, with Fair Use being the most well known.

In contrast, as defined by the Hewlett Foundation (2016), OERs are:

- Teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources
In-copyright and library-subscribed resources without open licenses are, by definition, not OERs. Access to library-subscribed resources is restricted to a particular community of paying subscribers. OERs are essentially comprised of works in the public domain, works with Creative Commons (CC) licenses (those which allow derivatives), and works with similar open licenses. Beyond digital availability, free access, and lack of paywalls, the potential of OERs is perhaps best viewed through the lens of threshold concepts, with OERs differing from in-copyright and pay-restricted content in at least three important ways: 1) free access is required, 2) modification and redistribution are allowed, and 3) attribution is required (except for public domain resources where citations are part of good scholarship).

**OER Threshold Concept #1: Beyond prohibited copying to free access**

Public domain and CC-licensed materials may be shared, copied, and distributed with attribution, without charge, and without fear of copyright infringement. When authors openly license and publicly share their content, challenges related to sharing, copying, and distribution vanish.

**OER Threshold Concept #2: Permission to create derivatives, remix, adapt, and share**

OERs allow creation of derivatives, remixing of similar materials, and adaptation—in other words, users can make changes in the materials. This may be startling at first. It has been common for instructors to combine material from different sources—chapters, videos, “reasonable and limited portions” of a work—under fair use. Using substantive portions, making changes, combining separate works, and publicly sharing the end product has not, however, been the traditional model, in part because technology did not allow it, and in part because instructors and students have been trained to be wary of plagiarizing sources and violating copyrights.

Materials released under an open license or those in the public domain do, however, permit creation of derivative works, the remixing or combining of works, and adaption or customization of existing works—like creations using Rijksmuseum artifacts 1, animated GIFs 2, and a wide array of music, video, images, and text shared with CC licenses 3.

**OER Threshold Concept #3: Giving credit or “attribution is required”**

Giving credit when using quotes, ideas, or figures from another source is always appropriate within a scholarly context. Those using works licensed under Creative Commons must also follow the terms of this license and provide attribution. More details on attribution are available in best practices for attribution (Creative Commons, n.d.)
Why Create Derivatives, Remix, or Adapt?

The possibilities inherent in OERs raise questions about materials that might be adapted to fit a particular course, remixed to create something new, or critiqued and improved upon to show student mastery of a topic. And the work itself, of course, takes effort.

Instructors often choose to create a derivative resource, or remix or adapt existing resources, because they cannot find current and reasonably priced materials that fit their courses, learning objectives, and pedagogical approaches.

Certain values and goals may push a faculty member to consider adapting an OER text. For example, we wanted Virginia Tech’s first open textbook, Fundamentals of Business (Skripak, 2016) to be:

- freely available to students and to the world,
- a high-quality, current, accurate, appropriately sequenced text mapped to course learning objectives,
- engaging for students, with current and culturally relevant text and images,
- available as individual chapters in our learning management system
- 508-compliant and accessible to screen readers,
- as openly licensed as possible and easily editable by others,
- and available from the University Libraries as an at-cost print-on-demand version.

Each of these goals influenced the book’s content, formatting, and features.

Steps in Publication

There are three main options for adapting, remixing, and creating derivative resources. The first is to scrub the text of formatting, make textual changes, and create a new design and layout. The second is to edit within an existing format or platform, understanding that certain platforms are more amenable to small changes while others can accommodate deeper, more significant changes. It’s easy, for example, to edit a few words, a paragraph, page numbers, or individual images within a screen-readable PDF, as long as you plan to keep the same page breaks. Making significant changes across a PDF document, however, is very difficult.

The third option is to use a platform or template that allows editing but lightens the burden of layout and design. Several are designed to support editing at the source level and couple manuscript development with layout. These include HTML with stylesheets, LaTeX templates, the Pressbooks platform, OpenStax’ Connexions remix system, software or courseshells in learning management systems or virtual learning environments, and platforms that implement templates or custom tagging such as Overleaf and Markdown, respectively, or file types such as Epub or Mobi. Each has its own learning curve and may require a certain degree of manual clean-up.

Unless the source document is available or the file type, source language, or platform has been created to allow
easy editing, making deep or substantive changes may be difficult. The guide Modifying an Open Textbook: What you Need to Know (Cuiller, 2016) outlines ways to analyze the potential scope of your project before starting it.

Some institutions offer publication production assistance for everything from LaTeX layouts and platforms with pre-set templates up to assistance from a library publishing initiative or University Press. Instructors and faculty often learn of the possibilities for adapting and remixing openly licensed content through the efforts and expertise of librarians, instructional designers, and colleagues who have developed and shared training resources.

**Practices and Examples**

Because OERs are, by definition, free of access barriers and thus do not require registration, it is difficult to know how frequently sources are remixed. At the level of creation, some platforms designed for collaborative authoring or linking of derivative works provide ways to follow the adaptation of openly licensed content. One example is Github, in which a project or a portion of a project is “forked” from an existing resource, allowing adapted works to be easily trackable. Works derived from OpenStax texts using their Connexions system are also easily counted and accessed, as they often include the original name of a work in the new title. While many instructors are still not accustomed to sharing beyond their individual courses, an emphasis on collaboration is emerging among groups such as the Rebus Community, and some open textbooks have feedback and registration loops so that adopters and adapters may receive updates and/or communicate with the original author(s).

Successful remix projects at several institutions demonstrate the value of this approach. Some individuals and groups, for instance, have “localized” and broadly shared open textbooks in an effort to make them more relevant to different audiences:

- At least nine Canadian editions were adapted from existing open textbooks by faculty supported by BCCampus. The texts, hosted in a Pressbooks platform and available in multiple formats, now include Canadian content, images, and references and, in some cases, additional chapters. These may be found by searching for “Canadian edition” on BCCampus’s site.

- Faculty, students, and staff at the University of Hawaii at Mānoa remixed multiple openly-licensed texts to create Human Nutrition (Summer 2018). The book, hosted on a Pressbooks platform, has an Hawaiian, Asian, and Pacific issues (HAP) focus, which makes it more relatable to students and is required by the university’s curriculum.

Others resources have been adapted to fit a local course, with curricular rather than geographical or cultural localization:

- At Virginia Tech I worked with multiple business faculty to adapt an existing, openly-licensed text to fit the course sequence and requirements for an introductory business course. The source material, originally released in 2011 as a PDF, was deeply edited, fully updated, and released in PDF and MSWord formats via the university’s institutional repository in August, 2016, as Fundamentals of Business (Skripak, 2016). We have also developed a Pressbooks version of the book’s second edition, which includes interactive features and enables easier adaptation.

- Two OpenStax textbooks were adapted by faculty authors at different institutions and published thru
OpenStax’s CNX publishing process. Chemistry: Atoms First (University of Connecticut) and Introductory Business Statistics (University of Oklahoma) were undertaken by faculty author/adapters at various institutions and published through OpenStax’s publishing process. Hundreds of OpenStax open textbooks have been adapted and reshared through OpenStax’ CNX platform as complete books or smaller modules.

Some users have adapted texts by putting them in a format which is easier to edit, and by replacing in-copyright images with openly-licensed images:

- The University of Minnesota’s eLearning Support Initiative and Publishing Services have adapted over 25 open textbooks from HTML into a Pressbooks format, updating images and other features in the process.

Creating, Remixing, Adapting, and Curating with Students

Some instructors use course material to set the sequence for a course. Others assign textbooks as the body of knowledge students must master, as an authoritative reference, or as a source of end-of-chapter questions used for homework. Still others engage with a much different paradigm by applying Bloom’s taxonomy to learning materials, realizing that students engage more deeply by evaluating, critiquing, and creating rather than reading to understand or recall from memory. This last group of instructors are leveraging OER adaptation, remix, and creation as learning activities. The practice of creating assignments that enable students to engage with the public knowledge commons, produce something useful for the world, and in many cases release content under an open license has come to be called Open Pedagogy (DeRosa and Jhangiani, 2017).

A few examples: In 2013, graduate students at Brigham Young University created Project Management for Instructional Design (Wiley, n.d.), an openly-licensed and remixed textbook developed in a semester-long, graduate-level course on project management for instructional designers, and refined by subsequent students (Randall, et. al, 2013). Students at Plymouth State University have curated public domain content to create the Open Anthology of Earlier American Literature (DeRosa, n.d.), a course reader hosted in the Pressbooks authoring tool.

Student learning projects can extend beyond adaptation and remix to the creation of new resources. For example:

- Since 2006, education faculty at Old Dominion University (Norfolk, VA) have engaged students in creating learning materials for their classmates and their peers in other institutions. (Kidd, n.d.) The project initially started in Wikibooks, moved to wittie editor, and now resides in Google sites. Authoring by students has enhanced student information literacy and technical fluency skills (O’Shea, et. al, 2011).

- In 2014, students at the Hong Kong Institute of Education cooperatively created an academic wikibook “Introduction to Linguistics” as part of their course. (Wang, 2014)
In 2015, I met Stephen Skripak, Professor of Practice in the Pamplin College of Business at Virginia Tech. Steve had noticed that students in his large introductory business course were not reading the assigned text, and was frustrated that the book was being issued as a new edition priced above $200. He began to explore other options, and was referred to me. After reviewing several openly licensed texts, he decided to update and customize one, and selected a Creative Commons NonCommercial Share-Alike 3.0 (CC BY NC SA 3.0) licensed text Exploring Business which seemed to match his learning objectives.

Because the book was four years old, we decided to update its data and pop-culture references and entirely replace the graphics. Steve and colleague Anastasia Cortes selected the portions of the book that best fit their learning objectives, organized content, wrote updates and new content, and commissioned others to write additional content. At least 40% of the existing book was discarded in this process, new sections were added, one new chapter was created, and cultural references were updated—Ugg boots, for example, were replaced by Timberlands, the Dixie Chicks were replaced by Beyoncé and Pitbull, and socialism was moved from mainstream to left of center on the spectrum of economic systems.

![Figure 1.4](image1.png)  Figure 1.4: The Spectrum of Economic Systems

![Figure 2.2](image2.png)  Figure 2.2: The Economic Spectrum

I reviewed the text’s tables, charts, and images to identify copyright issues, researched updated sources of data, and arranged graphic design and other project support. Using reverse image search tools, I identified and flagged multiple images which were not openly licensed, were of dubious copyright, or which appeared to be used without permission of the copyright holder. While some may have been used under fair use, it was difficult to discern, so they were removed from the text.

We decided to use only openly licensed, public domain images, along with graphics we created ourselves. Out of concern for downstream users, we opted not to pursue use of in-copyright images under fair use. We evaluated some of our copyright decisions on the basis of whether they would cause confusion or additional work for downstream users, a barrier to further remix I did not want to introduce. (I’ve learned that my approach was relatively conservative, as such use would likely be seen as transformative, which would fit within fair use. Further, some topics are impossible to teach or write about without asserting fair use.)

We encountered many challenges. Locating U.S. Government data for early chapters of the book, for instance, was more
time consuming than I imagined. Incorporating graphic design support brought new vitality to the book’s appearance, though we struggled to balance the competing demands of aesthetics, accessibility, electronic presentation, and print-on-demand formatting. A constant stream of questions, shifting timelines, and staffing changes influenced our processes at every stage, and compelled us to repeatedly remind ourselves of our initial goals.

We also ran into issues with the original book’s attribution. The first page indicated that the work was shared “without attribution as requested by the work’s original creator or licensee,” a reference to a formerly open publisher which had abandoned a business model reliant on open licenses and moved “from free to fair” in search for profits. To protect their market share, they apparently no longer wanted their name or the original author’s name on any versions of their texts. To address the attribution issue, I asked a colleague in the open education community for advice, and was assured that Creative Commons licenses are never retractable. At my request this colleague reached out to the author to ask how she would like to be attributed. There is more to this story, but there is a lesson here for authors and creators to read, understand, and carefully examine third-party agreements to ensure that their work can be read and reused, and that they will always receive credit and the right to use their own work as they wish.

In retrospect, before beginning our project, we would have been wise to obtain technical and workflow advice from publishing experts and others who had remixed works; what we thought would be a relatively simple process quickly became complex.

These are some of the additional challenges we encountered:

- A PDF file is difficult to edit, and extracting a PDF into MSWord makes the file very clunky. We were not aware that a version of the text was also available in HTML, which may have made our process easier.
- We attempted to export files from InDesign into MSWord for student reviewers, but these files were difficult to work with and could not easily be put back into InDesign after changes.
- The layout was more work than we imagined. Changes had to be noted by the author, conveyed to the project manager, and interpreted by the graphic designer. This plan for iterative layout and review lasted for only the first two chapters.
- We lacked the necessary publishing software.
- We had only a little money, and none to pay a faculty member who stepped in at the last minute to help with the layout.
- Our systems for tracking the copyright status of illustrations and figures failed when content moved from one chapter to another.
- We struggled with version control of multiple documents between multiple people.
- Onboarding additional collaborators part way through the process was time intensive and required review and clarification of our overall project goals, of Creative Commons licenses, and of work processes like finding, vetting, and attributing images and illustrations; it also required more discussions about funding.
- The research work load was intensive for just one librarian.
- The end-of-chapter citations were checked for broken links but were impossible to keep up to date.
- Our “editable” versions are in Microsoft Word, which, while ubiquitous, is far from ideal for layout and design, and these versions will become obsolete as the software ages.

It is an understatement but hardly a surprise to say that we struggled with workflow, tools, workload, and essentially inventing a publishing processes. For a new type of project the problems we encountered are not entirely surprising—but they certainly challenged our expectations.

By early August we finalized the book and stopped accepting changes. I worked with Bowker/MyIdentifiers to obtain ISBNs and with our graphic designer and Steve to design a book cover. Then I worked with Lulu Press to choose features of the physical book, and listed a print-on-demand version of the book via Lulu at cost (due to the NC license). In addition to creating a digital version of the book as both PDF and MSWord files, I divided both the PDF and Word document into chapters, each with an attribution cover page, and made these files available for download via our institutional repository, VTechWorks (Skripak, 2016).

Designing a book for electronic display is very different than designing a book for print. We designed a digital text and
then created a print version. Professional publishers, I’ve now learned, design for print and then create a digital version though many have moved to an XML-first approach.

The final version of the 2016 book has 17 chapters and is properly attributed as required by the original Creative Commons license. The public, electronic version of the book is available from VTechWorks, and has been downloaded over 100,000 times by users from around the world. The print-on-demand version of the book is available at cost for students who want a printed version (we do not make any money off the book). When it was ready for public release, I wrote a blog post (Walz, 2016), announced the book via various listservs and Twitter, and submitted the book to be listed in the Open Textbook Library, MERLOT, and OER Commons. The text has been used in multiple course sections during the past five semesters, by an average of 750 students per year. The Virginia Tech faculty using the book are actively adapting the text for the course, once again demonstrating the potential for remixed open textbooks.

Since issuing our revised version, we’ve made several discoveries. In addition to MSWord being proprietary, it continues to be a cumbersome program to use for layouts and ongoing changes. While it does allow files to be easily converted to a PDF format, it does not allow for interactive features.

In the second edition of the book, in Pressbooks, we have made the content more interactive, including linking to videos and adding self-assessment questions in each chapter. This edition also corrects minor errors, includes several new case studies, and includes an updated chapter on tourism and hospitality.
Several colleagues have heard others say that remix or adaptation is a nightmare version of a DIY (do-it-yourself) rehabilitation project, that it’s not worth it, and that you shouldn’t bother trying. My experience is on the more extreme side because of my initial lack of technical expertise and lack of awareness of the best platforms and tools. More and more people, however, are now aware of and working on authoring and adapting openly licensed texts. Tools have matured, problems have been resolved, and communities of practice have formed. Multiple technical, pedagogical, rights-related, and format-oriented resources have been developed since the 2013 release of “Six Steps to Modifying an Open Textbook” (Lalonde) and the 2015 open textbook Accessibility Toolkit (Collidge, Donner & Robinson), including “Modifying An Open Textbook: What You Need to Know” (Cuillier et al, 2016), “Guide to Developing Open Textbooks” (Moore & Butcher, 2016), “Authoring Open Textbooks” (Falldin & Lauritsen), “Guide to Making Open Textbooks with Students” (Mays, 2017), and the Self-Publishing Guide (Aesoph, 2018). There are also emerging collaborative communities such as the Library Publishing Coalition, the Rebus Community, and the Open Textbook Network Publishing Cooperative. The effort involved in adapting and remixing can only decrease as more people work to address challenges, share successes, and continue to refine their skills and approaches so as to leverage the potential of open licenses.

Authoring, remixing, and adapting openly licensed content is the best way to ensure sustainable, ethical, and lasting access to course material and zero materials cost for students.

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Dedication/Acknowledgements: This chapter is dedicated to Stephen Skripak and Anastasia (Katy) Cortes, Faculty in the Pamplin College of Business at Virginia Tech, who completed this project because they care about students. This chapter is also dedicated to Peter Potter, who joined VT Libraries after completion of this project. Peter has been and continues to be an invaluable sounding board regarding the publishing process.

Postscript: For those interested in publishing or a deep adaptation of an open textbook, I strongly encourage you to find knowledgeable mentors who will assist you in critiquing your plans. Patience and a resilient attitude are called for in these many experiences which combine traditional practices and innovative methods, platforms, and software.

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274 The Evolution of Affordable Content Efforts in the Higher Education Environment: Programs, Case Studies, and Examples


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