

## Going Open: A Textbook Replacement Design Case

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*This paper reports the design case focused on learning materials for an undergraduate educational technology course. In this case, the previously adopted proprietary course textbook was abandoned. In its place, the authors designed, developed, and implemented an original collection of open educational resources (OER) that when used together approximate a textbook. Key decision points in the design and development process are discussed, including the choice to create rather than adopt or adapt existing OER, the development of course content that fit the course needs, and the shift away from a more traditional textbook format. We also share thoughts about how to design, develop, and share OER that truly maintain the spirit of openness, making it easy for other instructors to not only adopt, but also adapt or remix and redistribute these learning materials as they see fit.*

*Keywords: design case, open textbook, open educational resources, design and development*

### Introduction

In the last decade, multiple issues have converged to make the development and use of open educational resources (OER) in the university classroom a priority for many faculty members. The Internet serves as an efficient storage and distribution mechanism, facilitating widespread sharing of learning materials. The rising cost of textbooks has become a concern in higher education, and many university students are suffering from financial issues such as housing and food insecurity (Broton & Goldrick-Rab, 2017). Students alternately go without textbooks or make course selections based on textbook costs (DeMartini, Marshall, & Chew, 2018). The contemporary generation of college age students is well known for seeking information online and for accessing a variety of media via mobile devices and computers (Lenhart, 2015; Scolari, Masanet, Guerrero-Pico, & Establés, 2018). They are willing to use digital texts and hold positive views of OERs (Abramovich & McBride, 2018). In sum, college students would benefit from low or no cost course materials, and are willing and prepared to access digital materials. The conditions are right for university instructors to shift to OER from copy-right restricted, proprietary textbooks when selecting course content.

This paper shares a design case that responds to the student need for affordable learning materials and preferences for using online resources. In this design case, we describe the process of switching from a traditional textbook to OER. Key decision points in this process included whether to adopt, adapt, or create content; what type of copyright and sharing we wanted to apply to our OER content; what content to include; the specific form that the content should take; and how the content should be shared. We also discuss how we managed a tight timeline by designing and implementing OER content in phases.

### **Literature Review**

Open educational resources are learning materials that are available to anyone for use because they either carry an open license or are in the public domain (Mishra, 2017). Open textbooks are a form of OER, and typically mimic proprietary textbooks in terms of form and function. OER may be created and shared by anyone, which has led some people to be concerned about their quality. However, when teachers evaluated and compared the quality of copyright restricted, open, and open and adapted textbooks, they rated both the open and open and adapted textbooks higher than the copyright-restricted ones (Kimmons, 2015).

Prior studies have found that well designed, high quality open textbooks are both well received by students and instructors (Christina, Stefan, & Georg, 2017) and support student performance as well as or better than proprietary textbooks (Feldstein et al., 2012; Fischer, Hilton, Robinson, & Wiley, 2015; Robinson, Fischer, Wiley, & Hilton, 2014). Additionally, open textbook adoption has yielded substantial cost-savings (Wiley, Hilton III, Ellington, & Hall, 2012), and educators who have used them report positive experiences and the intent to continue teaching with OER (Pitt, 2015).

### **Course Context**

The course for which the open textbook was developed is an applied technology integration course for undergraduate students. This course meets in a computer lab where students have access to a wide range of software programs. Because of the course topic and lab teaching environment, students in this course tend to focus mainly on the software learning portion of the course objectives. However, equally important are the course learning objectives focused on technology integration knowledge and design skills. Course assignments both require students to perform specific skills on the computer and to reflect on how computers can be used to support a variety of activities (e.g., learning, organization, management, communication, professional development).

In a typical semester, 6 sections of the course are taught, with approximately 20 students per section. The course instructors are advanced graduate students who have at least 18 graduate credit hours in the field and strong technology skills. During most semesters, about three-quarters of the students in the course are freshmen and sophomores who plan to major in an education-related field. Enrollments skew toward a white, female student population.

## **Course Textbook**

The course historically has used a paper-based textbook from a major publisher. The course team has transitioned through three different textbooks published by three different publishers during the last decade. Each textbook change was rooted in the desire to find a text with better alignment to the course learning objectives. In addition to the textbook, instructor-created learning resources have been used in this course, including slides, handouts, and podcasts.

The course textbook has continuously been a weak spot in the curriculum. In terms of content, we have never found a text that fully aligned with the instructional objectives. Additionally, technology textbooks rapidly become outdated. The technologies they discuss evolve rapidly, and each new edition typically includes a content update and reorganization, so students cannot purchase older editions. The textbook that best met our content needs had several content errors. The cost of the text steadily increased, and it had no resale value because it was printed on loose-leaf pages with no binding. Course instructors observed that many students did not seem own or use the textbook. We also recognized the irony of continuing to require students to purchase an expensive paper-based textbook each term, while teaching about and extolling the values of information access on the Internet in general, and Creative Commons licensing and open educational resources more specifically.

The primary advantage of assigning a textbook was consistency across course sections. The instructors had varying levels of prior experience with technology integration practices, and instructor turnover is high. The course team previously considered teaching without a textbook, but that solution would leave new instructors with relatively few content-based materials and could result in reduced consistency across course sections. Additionally, the course team considered simply linking to existing online materials (e.g., relevant videos and articles) from the learning management system, but this approach would leave instructors dependent on external resources that might be deleted, moved, or otherwise altered by other people in the midst of instruction.

## **The Design Opportunity**

Academic libraries have long been supporters of the open textbook and OER movements (Okamoto, 2013), helping course instructors find and integrate open textbooks into the curriculum (Davis, Cochran, Fagerheim, & Thoms, 2016) as well as supporting the development and publication of open textbooks (Sutton & Chadwell, 2014). Our library is no exception, offering an Alternative Textbook Grant (<https://www.lib.fsu.edu/alttextbooks>) to faculty members willing to make the shift to using OER. The grant offered a small amount of funding, as well as the opportunity to participate in OER workshops and work with librarians throughout our process.

## **Adopt, Adapt, or Create**

Upon receipt of the Alternative Textbook Grant, we had three options. We could search for and adopt an existing textbook. Having searched for open textbooks that were a good fit for this course in the past and not finding any, we were not confident it would be a fruitful approach. We

could adapt existing materials to suit our needs, but again we were not confident we would find sufficient baseline open resources to use for this purpose. Also, the amount of work we anticipated in order to adapt resources convinced us to take the plunge into the creation process. Thus, our solution was to design and develop our own electronic textbook for the course.

There were four reasons why we felt this was an appropriate solution. First, it aligned well with OER initiatives on our campus. Second, after years of supervising the course and using different textbooks the lead designer had clear ideas about the content that an ideal textbook for this course might include. Third, we were updating the course content and assignments annually, and desired a textbook that would evolve with the course. Fourth, we felt it was important to seize the opportunity to model OER creation and distribution for our students and our colleagues throughout the university.

Our solution was customized to our needs allowed for flexibility. We considered adopting existing OER, but found that, in many cases, what was available fell short of meeting the open resource 5 Rs: retain, reuse, revise, remix, redistribute (Wiley, n.d.). In other words, we could point to and ask students to use items posted online by others, but we could not alter or redesign these items. We wanted to be able to revise and remix content, with materials we could update and expand each term.

### **Intellectual Property Issues**

After deciding that we would create our own content, it became necessary to determine how we would handle intellectual property issues. Questions that arose during this process included: How did we feel about sharing this content with others? Would we be okay with instructors at other universities adopting these materials? Adapting them? Sharing those adapted versions more widely? How would we feel if someone tried to blatantly profit off of these materials that we developed? These questions represent the inner conflicts that arise when investing a lot of time and energy creating something. As we considered the answers to these questions, we felt good about the idea that our efforts could have a positive reach and help teachers and students elsewhere. At the same time, we suspected we would feel frustrated if our intellectual and creative work became widely adopted and went entirely uncredited, or worse, was credited to someone else who shared it. We also knew that we felt no need to profit from this work, and did not think anyone else should either. For this reason, we chose to create an open textbook using Creative Commons licensing (BY-NC-SA). This license asks that we receive attribution for our intellectual property and specifies that it can not be reproduced for commercial use. More importantly, it allows others to share it and adapt it.

### **Planning for the Five Rs**

We knew from our own experiences with OER that adaptation is not always easy. In part this is because of the types of files that are typically shared. People share packaged, final versions of what they have created, not editable process files. For example, we circulate PDFs more than word processor documents, and final edits of videos compiled in .mov and .mp4 files. When these file formats are used, the author controls what others can see, and also constrains the ease with which they can edit or adapt those files. Because we wanted others to be able to adapt the

learning resources that we created, we needed to think about how our end product could fully meet the 5 Rs, maximizing utility for others. As the initial concept emerged, we did not yet know how this would work out, but just that it was a goal. If a little extra effort on our behalf to design and share OER that were flexible and customizable would benefit others, then the effort would be worthwhile.

## **Design and Development**

### **Team and Initial Production Path**

The core design and development team for this project was the course supervisor and the lead course instructor. Additional course instructors provided guidance and feedback, and library staff offered support as well. The design and development process began during Summer 2018, with a beta version of the text launched in six sections of the course during Fall 2018.

With a concrete time-frame and a target launch date for a beta version, we developed a projected design and development schedule. Our plan was linear and logical, as was our vision of our final product. We would outline content, write content, edit content, develop supporting media (e.g., graphics and video, as necessary), and launch the beta version. In a parallel process, we envisioned searching for the ideal tool with which to build and perhaps publish our textbook. Ideally, we would have that tool selected before writing content, so we could immediately plug our text into the publishing tool. At the end, we anticipated having a book: a collection of chapters, roughly parallel in form and equal in length, with a linear flow from start to finish. Our book would be electronic by default, and might include some videos, but could easily be packaged as a PDF and sent to print. However, our process did not work quite so smoothly and, as described below, our simultaneous quest to find a tool and develop content led us to think about the development process and the end product in a different way.

### **Developing a Content Outline**

The content outline for the textbook was derived from the course syllabus. We entered the design and development process feeling that we had a well-designed course and thus designing the book to complement the course would be the best approach. Additional content needs were identified in a meeting with the course instructors, who provided feedback about what they would like to see covered and who identified areas of the course where students struggle the most. Throughout this process, the course objectives provided the boundaries for identifying relevant and irrelevant content.

We also sought student feedback, feeling that students who had completed the course successfully would have useful opinions about how a textbook could best support learning in this course. Fifty-two students completed the optional survey at the end of the Spring 2018 semester. On this survey, students were asked about content they would like to see included in a new textbook (see Table 1). The two most desired content areas were information about technology integration in the classroom (44; 84.6%) and technical tutorials (e.g., how to use a particular software function) (44; 84.6%). This feedback confirmed our impressions that the textbook should be heavily themed on presenting authentic teacher perspectives. It also addressed two

issues we had struggled with in the past: no existing text offered software tutorials that matched the requirements of our course assignments, and the software tutorials appearing in print textbooks were often out of date or for software versions that we did not use. Furthermore, some of the Web-based tools that we use in the course (e.g. Diigo, Twitter, and blogs) tend to not be represented among the software tutorials appearing in a technology integration textbook. This feedback showed us an opportunity to develop tutorials that would help our students complete course assignments, and to ensure those tutorials were up to date and reflected the software tools and versions used in our course. The least desired content involved examples, standards, and policies. This feedback reflected our perception that students in the course were most focused on using the technology to do things in a classroom, and did not yet understand how standards and policies affect teachers. Still, all content items were desired by at least two-thirds of the responding students, which confirmed that it all was important to include to some degree. Areas about which students were less enthused provided opportunities to develop content that would help more students understand the importance of these content areas to their future practice as technology-using teachers.

Table 1  
*Desired content in open textbook*

Item	Count	%
Information about technology integration in the classroom	44	84.6%
Technical tutorials (e.g., how to use a particular software function)	44	84.6%
Information about the future of technology in education	43	82.7%
Examples of technology-based lesson plans	42	80.8%
Design-oriented tutorials (e.g., how to design attractive slides/graphics)	41	78.8%
Information about technology and professional development	40	76.9%
Examples from real classrooms	38	73.1%
Information about technology and standards	34	65.4%
Examples of projects	34	65.4%
Information about technology and school policies	33	63.5%

The final content outline differed greatly from the textbook that we had been using, further highlighting the poor alignment between that textbook and course content and flow. The differences reflected both additions and omissions, as well as a restructuring of content.

### **Redefining “book”**

Throughout the design and development process, the concept of “book” created a tension for us. In previous semesters, the “book” was a physical item that students purchased, and it contained content with a logical, linear flow. That flow did not necessarily correspond to our course flow, nor did the topics always reflect our curriculum. In other words, “book” and “course” each had their own flow, and that flow did not consistently match. The task was to replace a textbook, and the language we initially used to describe the replacement incorporated the term “book.” With the notion of “book” in mind — a concept solidly rooted in a structure that consists of chapters, roughly equivalent in page length and form — we found ourselves stymied by the impulse to replicate elements of the very materials we were choosing to walk away from. Each topic to be covered needed to fit a chapter, and once a chapter topic was determined, sufficient content

needed to be developed to flesh the chapter.

Looking at how we actually teach the course, we saw how that content that might constitute a single chapter tends to be covered across multiple course meetings, and how supporting the attainment of required knowledge and skills to complete complex assignments could require engaging with content that crossed logical chapters. For example, when creating newsletters our students need to learn about desktop publishing, the role of newsletters in K-12 environments, intellectual property, and visual design. Some of these topics are quite brief (e.g., newsletters), whereas others represent areas that are revisited continuously throughout the course (e.g., intellectual property). We could, of course, wrap it all into a chapter focused on producing the assessed project — in this case, a newsletter — which would be unlike any textbook we had seen. However, this approach takes away the flexibility and potential future reuse by others by suggesting the individuals should use the intact chapter rather than inviting them to use, edit, and add to sections of it in whatever manner best suits their learning needs.

The concept of “book” also led to narrow thinking about the development platform. With an end in mind, we looked at file formats such as PDF and ebook. These file formats further reinforced our thinking in terms of page layouts and chapters. Then we considered how the learning material would connect to the course itself. Our university uses the Canvas Learning Management System to deliver course content, and any OER would either be linked to or embedded within a Canvas course shell. Canvas divides courses into Modules, and so we questioned whether we would simply link in a textbook, create it within one big module or distribute it across modules.

With time moving quickly and the fall semester rapidly approaching, our design conversations became increasingly practical. Having tried and dismissed a few different development tools, we determined that it was not necessary to have a tool in place in order to begin developing content. What was necessary was to produce learning content before the next term began. Thus we quite practically shifted our thoughts from “writing book” to “designing course.” This decision led us to use Canvas as the development platform, with the caveat that we could revisit the hosting platform and compiled file format questions at a later time. With our focus now on having a course shell full of content from which fall term classes could be taught, we began to create modules in Canvas. This format felt quite natural from an instructional perspective, and as we saw chunks of text fall inline with practice activities and assignments, it all made sense. We got further ideas about places where a video might be nice, or where a graphic could enhance the content.

Learning object by learning object, and module by module, we began to develop content. With a tight timeframe, we focused on critical content for the beta version. Much of the content took the form of brief (300-1000 word) text-based documents. Surprisingly, writing in short form was simple. We focused solely on discrete content chunks with no consideration of flow from a larger chapter. In many ways, the process was similar to drafting slides and lecture notes for use during a class session.

The materials were not solely text-based. For the beta version, explanatory graphics were created and included for some topics. In other topical areas, open access graphics were used and

appropriately credited. Additionally, we solicited brief (1-3 minute) video testimonials from practicing teachers focused on how they use technology. Collectively, these content elements provided a sufficient framework for teaching the course without a textbook. From an alternative perspective, these content elements *are* the textbook, only in a more relevant, embedded form. The students were able to use the combination of materials and in-class activities to learn the necessary knowledge and skills to complete course assignments. The beta version development process concluded with a list of “nice to have” content for development and inclusion in the next iteration of the materials.

Throughout our development process, we also focused on creating materials that would meet the needs of students with disabilities. We have been diligent about hosting text directly in Canvas rather than as PDFs, creating tagged PDFs when PDFs have been used, providing alternative text for graphics, and captioning and alternative forms for videos.

With time, the concept of a compiled version of the book has become less important to us. When we launched the new Canvas site, we watched students in the course fluidly use the learning objects. They did not struggle to see the relationship between individual learning objects, and they did not complain about lacking a compiled, linear book.

### **Revision, Addition, and Working Toward Open**

Our OER solution, because it was customized for the course, provides better alignment with our course assignments than the previously adopted textbook. In particular, it includes examples of the types of projects that students might create to fulfill course requirements. Because the learning materials are open and we can edit them at any time, it is easy to reflect any updates to software or assignments used in the course. We are continuing to refine the materials, adding learning objects that represent examples and extensions of the base course content. Our progress has been slow, but steady. We recognize that in another year we should have a solid, tested set of learning materials in place, but that we will likely continue to adjust the materials annually, if not more frequently.

One exciting enhancement we are working on is an assignment through which we will invite students to submit their own work as examples to be included in the textbook. This approach will allow us to always have current examples of course projects, which is particularly important given the rapid changes in software programs. In this sense, we are not only using OER, but also incorporating renewable assignments (Wiley, Webb, Weston, & Tonks, 2017) into the class.

Completing the learning materials to our own satisfaction is not sufficient. Other steps are necessary to make the materials truly open to others. The course design including course materials are being shared in full via Canvas Commons. Other instructors and students are free to use the course design in whole or in part. However, knowing that not everyone can access Canvas Commons we plan to offer a parallel version of the content hosted outside of the Canvas learning environment. We are not yet sure if that will entail submitting to a repository (Day & Erturk, 2017), or hosting on our own server. Although the full details have yet to be determined, we remain committed to providing truly open materials, meaning that they can not only be adopted by others, but also easily adapted or customized. In order to make this possible, we will



need to supply two copies of the course materials to the extent possible – complete or “published” versions for use as-is (e.g., PDFs, videos), and editable files.

### Discussion and Conclusion

We have found that shifting from a traditional textbook to a collection of customized learning objects has been positive in this course. We were able to control the quality and content of the materials, and long-term, we see the benefits of being able to edit, reconfigure, reorder, and add to these learning resources. We should be able to create compiled versions for students who prefer to download and access the course materials as a single unit, and printable versions, perhaps with transcripts in the place of videos.

The OER that we have designed and developed are a custom fit our course, but may not be a perfect match for other educational technology courses. However, we hope that other instructors and students may find some collection of these materials useful for their own learning experiences. Digital copies of OER are most useful when repurposing or reusing them (Mishra, 2017). By providing both “published” and editable digital versions of the materials, and defining the OER unit at the micro level (e.g., three paragraphs on a topic or a single graphic, harkening back to an earlier trend, the reusable learning object) rather than the macro level (e.g., a compiled collection of unit or course content), more people should find these learning materials useful.

The design and development process pushed us to think deeply about two issues. The first was our own “book” mindset, which was not helpful when creating learning content for the course, and the second was what it means for OER to be truly open and useful to others. Although we had both previously worked with learning objects and had taught course without textbooks, the initial charge had been to replace a traditional paper textbook with an open, electronic one. Applying the concept of “book” to the development of OER was confining, and would have resulted in a less useful, less editable final product. Shifting from a single-unit course material to many smaller units supports flexibility for both editing and overall content flow. Additionally, it was helpful to consider the challenges we would have faced in adopting existing OER when designing our OER. In this sense we designed with two end-users in mind: our own students, and instructors teaching their own courses elsewhere.

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