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ORIGINAL PAPER

Developing an Open Textbook for Learning and Instructional Design Technology

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Abstract
Despite the emphasis on open educational resources in our field, there are surprisingly few examples of open textbooks in our field, as well as in graduate education generally, despite the findings from research that these books can be affordable, high quality, and advantageous to students and faculty. In this article I describe one process for creating an open introductory textbook. I discuss design decisions, technological choices, and lessons learned, including suggestions for other potential book creators, in an attempt to encourage further development of open book scholarship. I also share initial data on student perceptions about the book, and my conclusions about the textbook creation process.

Keywords Open textbooks · Open educational resources · Textbooks · OER

Curriculum materials, such as textbooks, "dominate teaching practice" and "are the stuff of lessons and units, of what teachers and students do" and how educators "strive for a common curriculum across diverse settings" (Ball and Cohen 1996, p. 6). For better or worse, it has been argued that "the textbook publishing industry and the artefact of the textbook are fundamental in the distribution of 'legitimated' knowledge to school classrooms" (Richardson 2004, p. 505). However, in the networked and distributed knowledge era of the internet, it is no longer necessary to rely on commercial textbooks as the only source of this curriculum.

In 2018, a new, open textbook for the field of learning and instructional design technology was officially launched—*Foundations of Learning and Instructional Design Technology*. While open textbooks in general are not new, we have a surprising small number of open access books in our field. This may be because for many would-be authors, the process for creating and dispersing open textbooks may still be unfamiliar. Thus, in this article I describe my process for creating an open introductory textbook in an attempt to encourage further development of open book scholarship. I begin by first reviewing the literature on open books, followed by a description of the process used in creating the *Foundations* textbook, along with a discussion about future development of the book and a call for other scholars to produce similar materials. In describing this journey, I will highlight key decisions that I made in an attempt to assist other scholars in their own decisions about book authorship/editing.

Research on Open Textbooks

As yet, there is little scholarship on the effectiveness of open textbooks in general, and in higher education specifically, and even more so with graduate education. However, it is worthwhile to review the findings on open textbook scholarship at these various levels to draw conclusions about the potential value of these materials in graduate education.

The first finding related to adopting open textbooks, is that, unsurprisingly, they save students and schools a lot of money. Wiley et al. (2012) found that with 20 teachers and nearly 4000 students, that the open textbooks reduced costs by 50%. Hilton III and Wiley (2011) found that even if the textbook materials were free on the web with the option to purchase in print, that 1/3rd of students chose to purchase Flat World Knowledge printed books, at an average cost of $30.89—much less than the average cost of $80 for the 2015–2016 school year (NACS 2017).

However, besides being more affordable, do students and faculty like open books? Bliss et al. (2013) surveyed 125 students and 11 faculty from seven community colleges and

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found that only four students felt the open books were worse quality (over 40% felt the books were actually better than their commercial counterparts). The students were also overwhelming positive about the use of the books in the course.

Perhaps it is not surprising that open textbooks would be more affordable and better liked by students. But are they as high of quality? Robinson et al. (2014), analyzed the adoption of open science textbooks in secondary schools in Utah and found that the students using open textbooks scored .65 points higher on end-of-year state standardized science tests compared to those students using traditional textbooks. Even more impressive was that this result was achieved when controlling for 10 student and teacher covariates. At the college level, Pitt (2015) studied the adoption of OpenStax College textbooks and found that educators reported greater student participation, cost savings, more responsiveness to student needs, and sometimes pedagogical change. More recently, Belikov (2017), analyzed rigorous faculty peer reviews of open textbooks in the Open Textbook Library, which were based on 10 quality criteria. She found the vast majority believed these open textbooks to be high quality and on par with commercial books, with any existing flaws described as minor and not sufficient to interfere with classroom use (they also noted similar flaws exist in the commercial competitors).

In our field of Learning and Instructional Design Technology, the development of open textbooks is small, but growing. There are a few books available for specific courses and noteworthy work by specific universities and presses, such as Athabasca Press (see http://www.aupress.ca/index.php/books/bySubject?s=5). However, the availability of books for the core courses commonly taught across most departments (West et al. 2017) is very rare.

If open textbooks have such strong benefits without any perceived lack of quality, why are they not more common? Frydenberg and Matkin (2007) identified several barriers to creating and adopting these open materials, including the initial cost for creating and then sustaining the resources, and the energy required to break free from the inertia of faculty using a textbook or a publisher with which they are already well acquainted. Technology was also identified as a barrier, because most faculty do not have the technological abilities or infrastructure for book creation/publication/dissemination. In addition, Frydenberg and Matkin (2007) noted distribution and discoverability is a barrier to increase adoption. Particularly if faculty are not receiving payment for creating the open book, their incentive would be prestige in their discipline, which can only come through high distribution and visibility.

However, overcoming these barriers is important as there are many potential benefits to students and faculty. Currently, as Harley et al. (2010) noted, "there simply are not enough currently available [books] in enough disciplines to satisfy the multitude of faculty and student needs in lower and upper division courses; a much wider array of high-quality, easy-to-use, and reliable open textbooks will have to be produced for more widespread faculty adoption to be realized" (p. 1). This problem is even more acute in graduate education, and especially so in a niche discipline like Learning and Instructional Design Technology. Simply put, the number of open textbooks available for teaching core courses in our field can probably be counted on one hand, which is surprising given that open educational resources is a main area of research. We have a few open research journals (Perkins and Lowenthal 2016), but are lacking the open teaching materials.

In this article, I seek to provide a case study and lessons learned from my own experience creating an open textbook for the field, in the hopes of inspiring other would-be open book contributors.

Context and Process for Creating an LIDT Textbook

According to West et al. (2017), a common course for programs in our field is a foundations course, typically offered for new students. Because undergraduate programs in our field are practically nonexistent, students begin their journey with a wide variety of backgrounds. Some have been teachers, some programmers, some psychologists, and some technologists. As Rieber (2018) noted, there is no one and only "proper" training for an instructional technologist. Because of the variety in backgrounds, these students begin their graduate careers without a shared understanding of the history, issues, and discussions in the field. This can be disorienting, and is why these foundation courses are important.

For those who teach these courses, there are many excellent commercial textbooks available. These books are typically well written/edited, and provide an effective survey of the field. However, in my own journey as a teacher of this course, I felt there were many benefits that an open textbook could provide. First, I desired a book that I could manipulate to fit the course how I taught. Second, I wanted to be able to integrate classic articles and readings so that all of the reading material was in one location for students. Third, I wanted to be able to update the book quickly, especially because our field is one of very rapid advancement and evolution.

For several years I collected ideas for articles that I knew were openly available, as well as topics that I felt needed to be represented with material that did not yet exist. Finally, in the summer of 2016, I took the plunge, and committed to creating the book in preparation for my Fall 2016 semester.

Technology for Creating the Book

Unfortunately, there is a hole in the market for quality book production tools. A clear leader is iBooks, which can only produce books readable on an Apple computer. Other tools,

such as Inkling, exist but are designed and priced for enterprise use and are cost-prohibitive for individual book authors. Of course, there was always the option to just create the book in Google Docs, or on a website, but these options all had drawbacks, including a lack of features for the book creator and for the students in how they could choose to read the book. In 2011 Pressbooks was launched by Hugh McGuire, the founder of Librivox (Pressbooks—reviewed, 2015). Pressbooks was designed to make publishing simple and accessible to any author, and is based on the popular Wordpress platform. After creating a Pressbooks title in your free account and selecting one of the many professional themes, the author puts the content of each chapter in a Wordpress blog post, which has pre-defined text styles for headings, various textboxes, and special text features such as captions (See Fig. 1). These posts are then organized into book sections (see Fig. 2), with prompted popular book features such as a preface or acknowledgments. Export options including exporting the book to common formats such as pdf, epub, and mobi (e.g. Kindle format, see Fig. 3), and the option is available to customize the CSS of any of the theme options (see Fig. 4). The end result is an incredibly easy process for a text-based book, where publishing each chapter can happen in a matter of minutes. A weakness of the tool, however, is that it is not as well-suited to media and images.

In reviewing the tool, I decided to use Pressbooks because I was familiar with Wordpress, and the option to export to pdf/mobi (Kindle) was appealing, since I knew that many students still prefer to read books in a paper format or when they are offline. I also estimated that Pressbooks would continue to evolve and add additional features and support over time, and I appreciated the option to have multiple editors on the books since I would be involving many others in helping in the book's development. Pressbooks also easily handles various copyrights, allowing me to assign any copyright license to individual chapters. Thus, I was able to accommodate articles released under creative commons license as well as thus republished by permission.

The Title of the Book

Naming the book was surprisingly difficult. "Foundations" was an easy choice, but foundations of what? Our field has a tricky history of trying to define itself. How many professional organizations have a whole committee involved in simply defining the field (see the AECT Definition and Terminology Committee)? In the end, I wanted a name that would be as inclusive as possible to all the various programs in the field, settling on "learning and instructional design technology" to represent both learning and instruction-centric perspectives, and the important role both design and technology have played in our history (see Fig. 5).

Book Sections

In my teaching of the course, I begin with a metaphor of a tree, explaining that to understand the tree, you do not only look at the trunk, but also the roots and the branches. As a metaphor

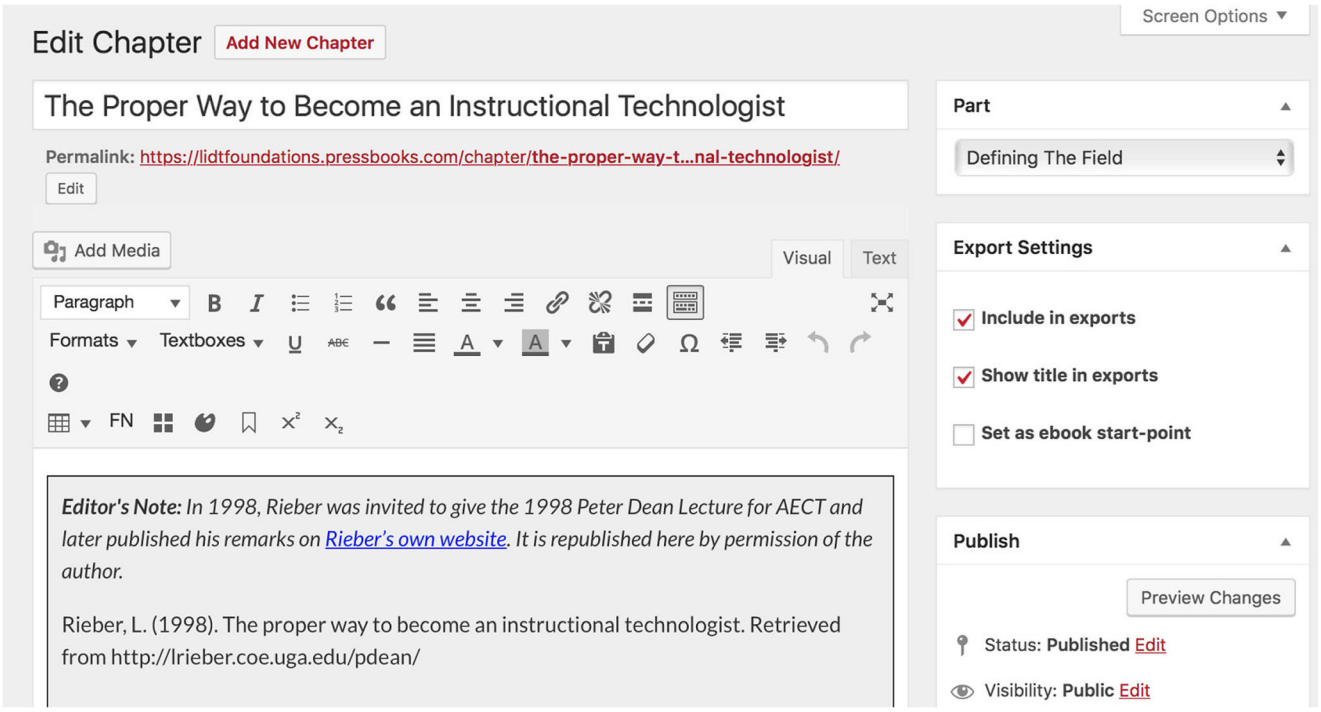

Fig. 1 Chapters are placed as Wordpress blog posts within Pressbooks with easy text editing features and export options

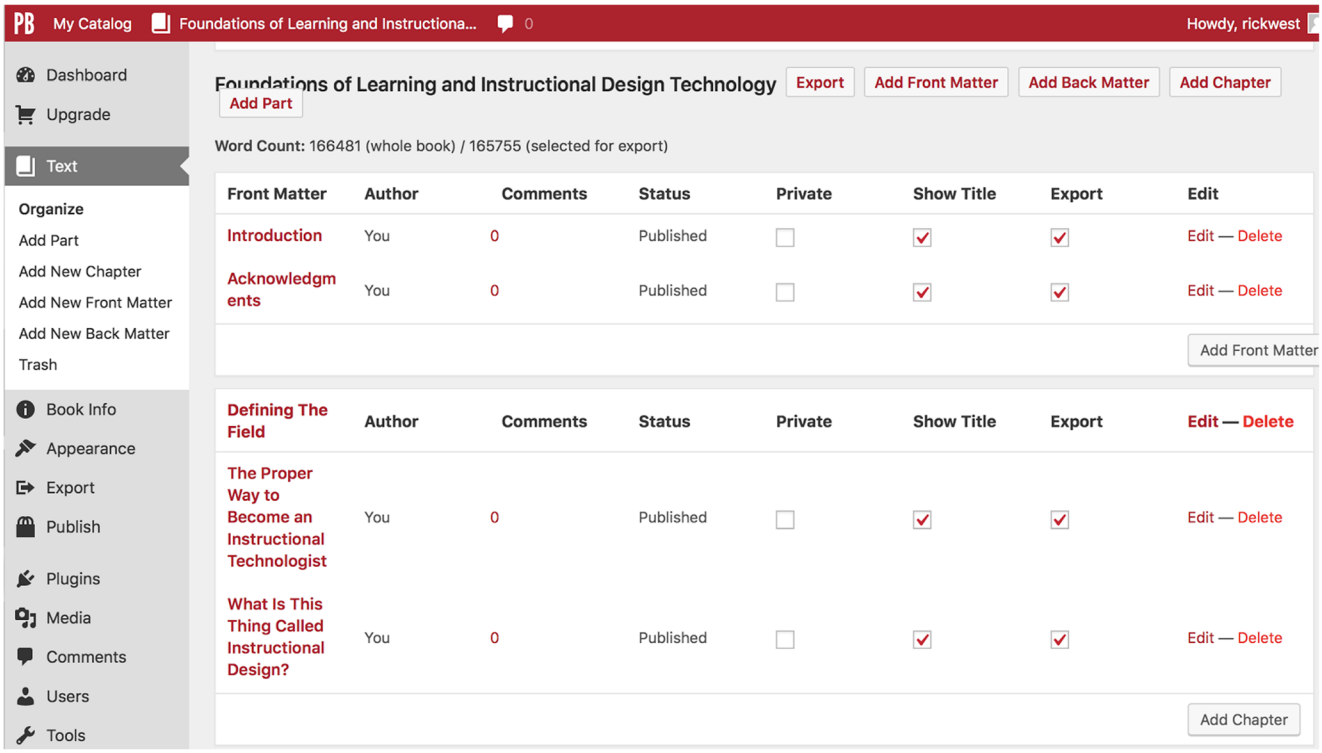

Fig. 2 Book organization in Pressbooks, including the option of having chapters set to private while they are still being developed

for the class, the roots are the historical foundations of the field, the trunk represents current topics, and the branches are the future of the field—or the students themselves and their personal journeys. Thus, I originally organized the book according to these sections: History, Current Topics, and Professional Development.

I eventually reorganized the book into its current form for various reasons. First, the sections were uneven, with the

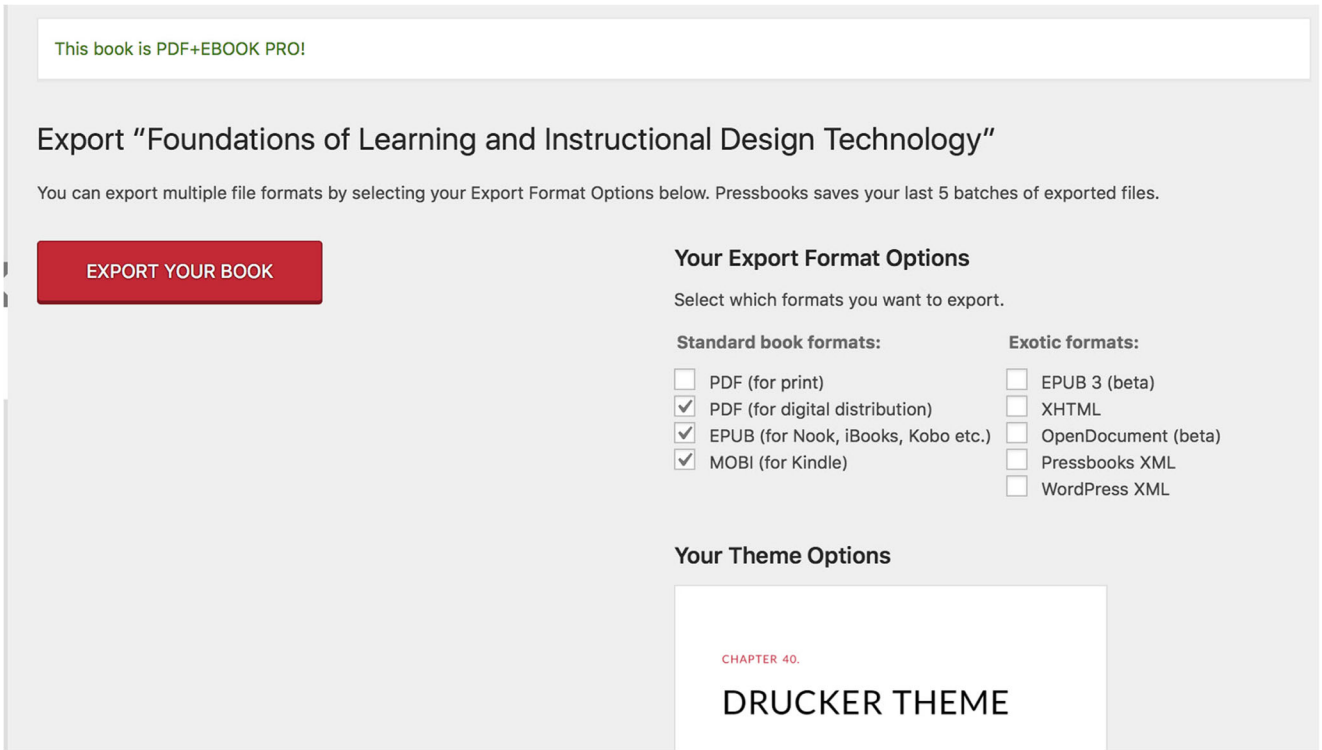

Fig. 3 Export options in Pressbooks

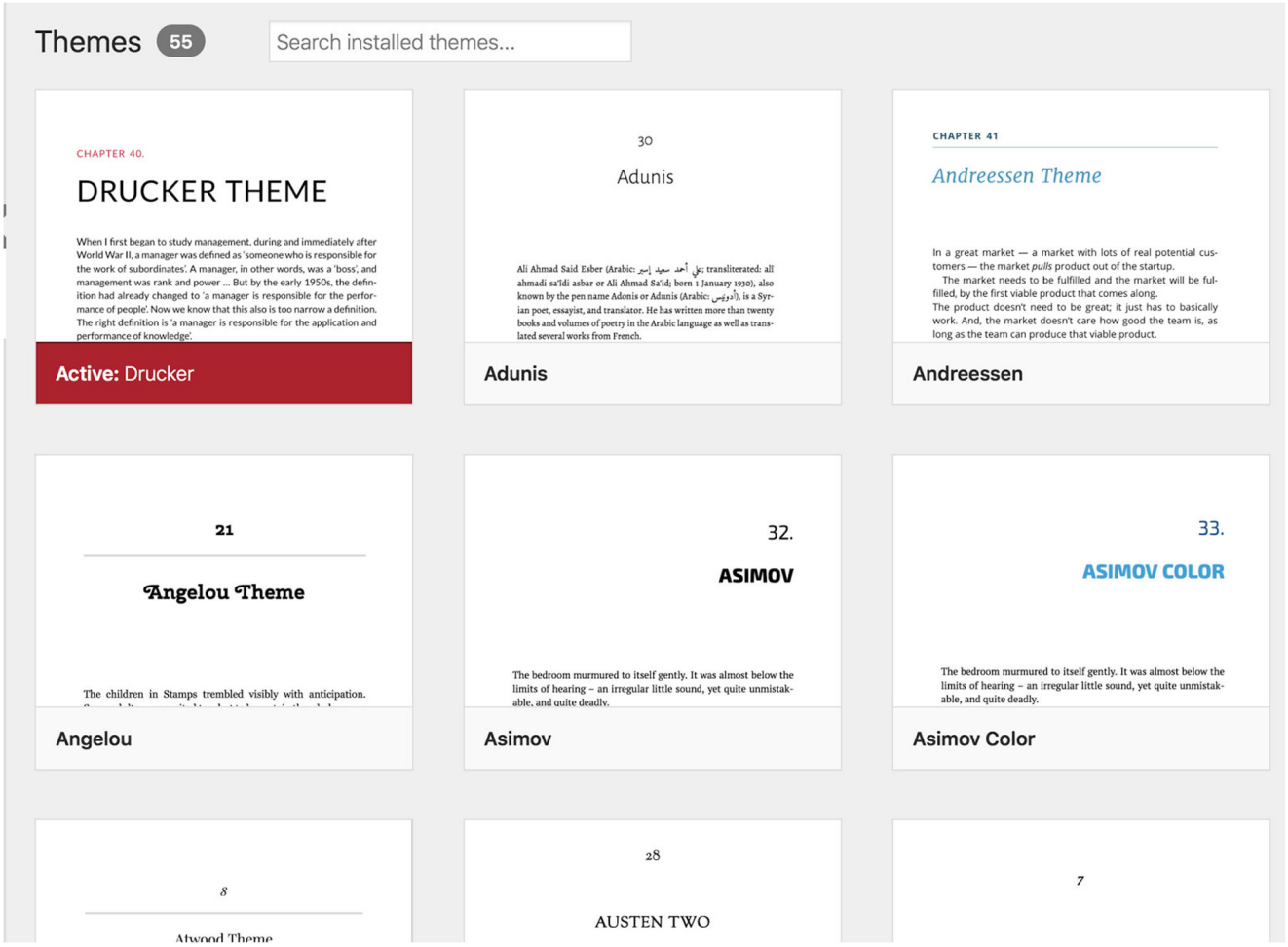

Fig. 4 Various professional theme options in Pressbooks. These themes are provided with suggestions for what type of book (e.g. fiction, non-fiction) they are best suited

Current Topics and Professional Development sections getting too long, which in Pressbooks became difficult for students to navigate. Second, many topics were difficult to place. For example, is distance education a historical chapter or a current topic? What about design-based research? I also wondered whether my personal metaphor of a tree would communicate well to others. For these reasons, I eventually organized the book according to its name, with sections related to learning and instructional theory, design, and media and technology, while preserving the final section (which became two) on professional development.

Curating the Material

In summer of 2016, I began scouring the internet for appropriate materials. In doing so, I made the following decisions:

1. I wanted to book to not expand indefinitely but to remain roughly the size of a book that could be read by a student in a semester, except for the professionalism section where I anticipated students would pick and choose chapters relevant to them.
2. I wanted chapters to be short so that more topics could be included in the book without the book as a whole getting too long.
3. I wanted the chapters to be readable and accessible in their language to senior-level undergraduates or first semester graduate students. Much of the scholarly literature is full of jargon and complex writing, and sometimes complexity is necessary for in depth scholarship. But for this book I wanted the chapters to be accessible overviews that introduced the students to interesting topics and helped acquaint them with the scholars and studies they could read on their own. Thus, I saw the chapters as advertisements for their various topics, not in-depth treatises. Students who then found a topic enticing could dive deeper by following up on the references in the overview chapters.
4. Whenever possible, I preferred chapters that were openly licensed (creative commons).
5. However, my first goal was to obtain quality chapters, whether they were openly licensed or not, as long as they

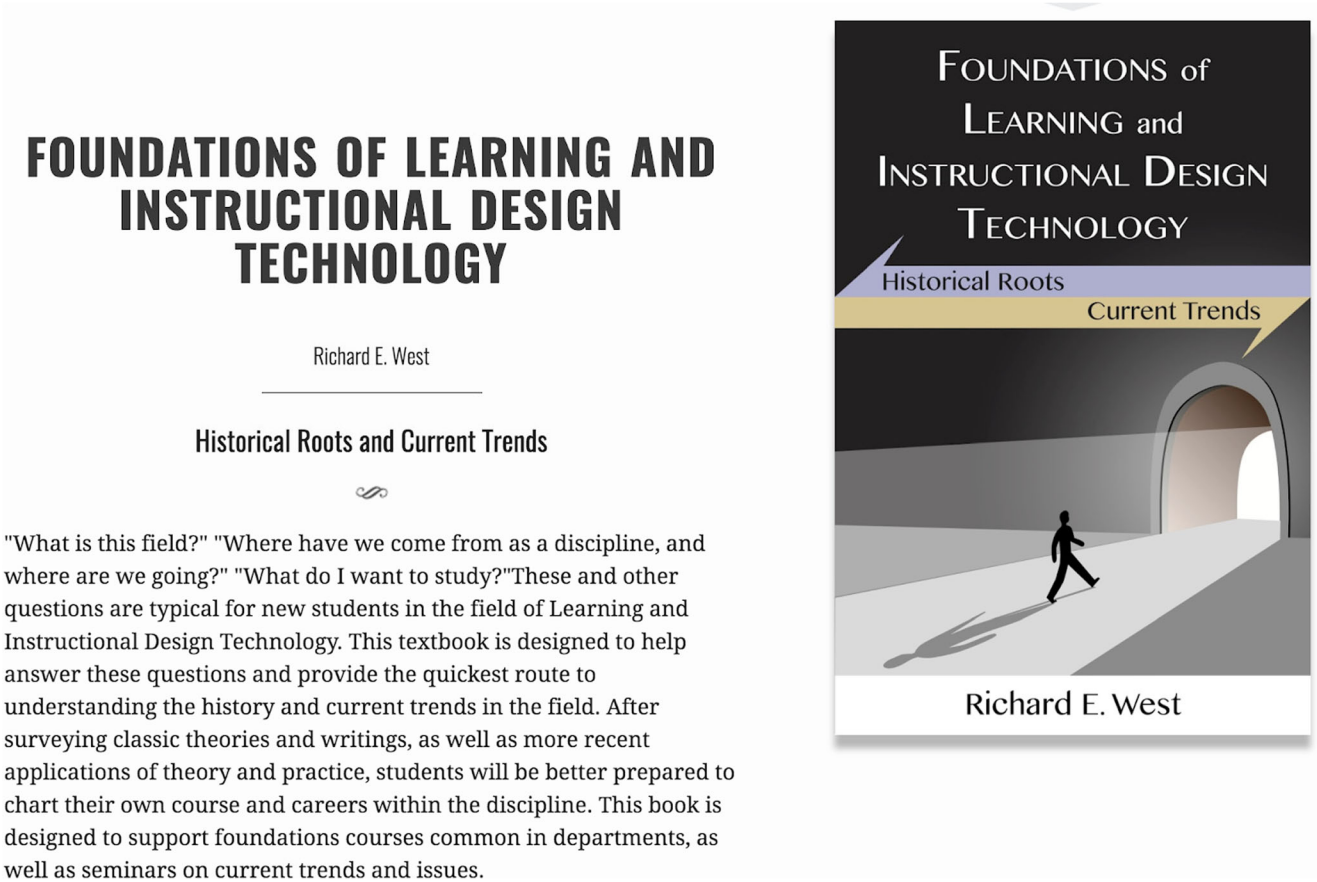

Fig. 5 Cover of the textbook in Pressbooks

were openly accessible or available by permission. When I struggled to find openly licensed material, I ended up republishing many more traditionally copyrighted chapters (with permission) than I originally intended.

In looking for chapters, I began by searching open textbooks such as those available on openstax, Flat World Knowledge, and the Open Textbook Library. The problem I found was that the vast majority of these books were geared towards undergraduates, and were typically general education courses. Thus, while I did reuse some material on learning theories from psychology textbooks, these open books were less useful. I found several excellent open books published by Athabasca, but they were not typically introductions to a topic, but instead in-depth scholarly publications on narrow topics that I felt were less useful to a foundations textbook (even though I did use one chapter on data analytics from the excellent book *Emergence and Innovation in Distance Learning*, edited by George Veletsianos).

I also searched the archives of open journals such as the *Journal of Applied Instructional Design, Interdisciplinary Journal of Problem Based Learning, International Review of Research on Open and Distance Learning*, and *Australasian Journal of Educational Technology*. However, as could be expected, most of these articles were reports of specific research studies rather than overviews of a topic.

Feeling unsatisfied in the amount of openly licensed material available, I looked at potentially republishing copyrighted materials. As a consulting editor for *Educational Technology*, I already had a relationship with its editor, Larry Lipsitz, who gave me permission to republish articles from his publication. These were often a good fit, because they were short, theoretical, and accessible in their tone. I also received permission to republish a few articles from other places, including *TechTrends*, the *Handbook of Educational Communications Technology, Performance Improvement Quarterly*, and *Innovative Higher Education*. In many cases obtaining this permission was quite an arduous process.

The final source of material came from newly written articles. I created a call for chapters that I distributed on the Professors of Instructional Design Technology Facebook group, as well as AECT social media outlets. I was skeptical that very many scholars would invest their time in writing a new chapter for a new book edited by a new editor—and an open textbook to boot. However, I was pleasantly surprised by the response as many authors contacted me about contributing pieces. This call for chapters originally went out in fall of 2016 and was then repeated in summer of 2017.

Iteration and Feedback

I launched the book in beta form in my course in fall of 2016. After explaining to students that the open textbook was rough, evolving, and unfinished, I gave them the choice of either using the traditional commercial textbook or the open beta book. All of them chose to use the open book for that semester. At the end of the semester, I queried the class in an online survey about the book and received mostly positive responses, with 95% encouraging me to continue using the book (Fig. 6).

I also asked the students how useful they felt each individual chapter was, and received similarly high scores for most chapters. In Fall of 2017 we implemented surveys at the end of each chapter to set up a process for continual feedback at the chapter-level. While the numbers of responses are low ($n = 19$ individual responses, spread out across various chapters), only two chapters were recommended by students to be revised, with the overall rating on the chapters to be 4.1/5 (5 = definitely continue using this chapter).

This feedback has helped me already to make decisions about which chapters to replace or revise, and will continue to guide future development of the book.

One of the benefits of an online textbook is that it is possible to continually update the chapters, or replace them if needed. Thus, in the current version of the book, as mentioned, I have embedded surveys at the end of each chapter to continue receiving information that authors can use to update their chapters or to assist me in developing the book. In addition, I asked my students to tell me if they spotted any errors. One student asked me, "how often do you hear about each error?" Because I could fix errors immediately upon learning of them, my answer was, "Only once. The errors don't stay around long enough for others to see them."

Final Release

Through fall of 2017, I considered the book to be in beta as I gathered material and fixed errors. The final chapters were submitted in December, and after review and copyediting, the book was "released" with a January 2018 version date. I then worked to export the finished book to PDF/Mobi.

Future Versions

In considering previous online books, I felt there were two potential pitfalls common to online books: First, book authors no longer update the book, letting it languish, untended, on the internet and eventually passing out of relevancy. Second, if another editor/author comes along and updates the book, this could potentially erase the byline and contribution of the first author. Because I wanted the book to stay current, in the call for chapters, I outlined that it would be updated and released as a new "edition" every five years, and authors would be asked to update their chapters in order to remain in the book. Because I wanted authorship in this textbook to be "counted" as real scholarship for the chapter authors and thus have a permanent place on their vitas, by versioning the book to a new edition, authors can forever list on their vitas their article in the first edition.

What a second edition of the book may include will depend in many ways on the feedback from students and other scholars. However, I anticipate replacing some of the older chapters with newer material, and incorporating more multimedia elements, particularly as the Pressbooks technology evolves to allow more multimedia embedding.

Supplemental Readings

I found the process of creating and publishing an open textbook with Pressbooks to be so simple that I created an assignment option for students in the course to create their own book. To simplify the process for these new students, instead of searching the internet for material, we limited the assignment to republishing articles from *Educational Technology* only. I did this for two reasons.

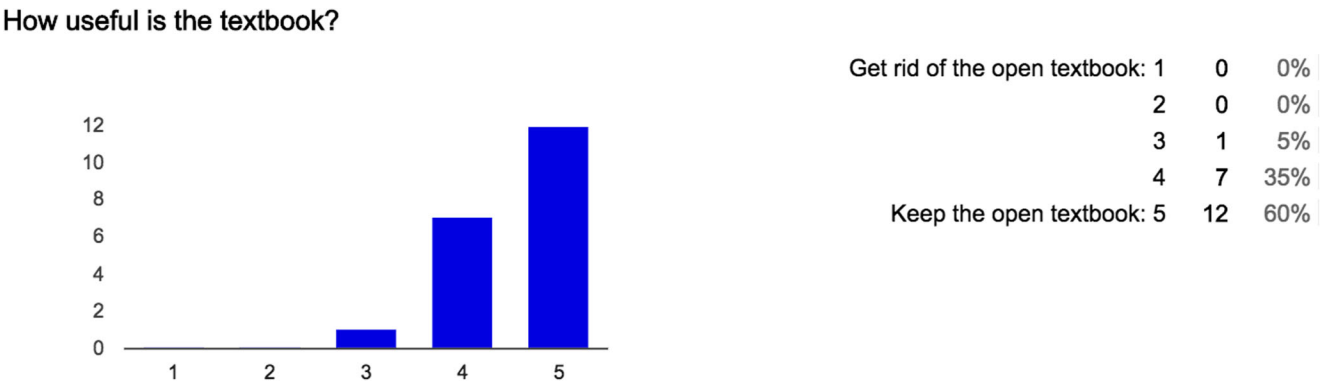

Fig. 6 Student end-of-course feedback on the beta version of the book

First, I had permission from Larry Lipsitz to republish these pieces, and I believe there have been many classic articles published in this magazine over the decades. Second, with Larry's passing, and the closing down of the magazine, I worried that many of these articles would vanish and be forgotten.

In this assignment, students selected a topic, and then searched the archives of *Educational Technology* for articles on that topic, selecting the ones they viewed as most impactful or important, and republishing them in a Pressbook with a summary overview essay. Two of these books have been published: *Narrative in Instructional Design* and *Creativity* (https://idnarrative.pressbooks.com, see Fig. 7) and *Creativity and Innovation in Education* (https://educationinnovation.pressbooks.com, see Fig. 8). Beyond being a worthwhile class assignment, these are legitimate scholarly contributions as collections of classic and important articles on specific topics. These books will be useful for students—or anyone—seeking to delve deeper into studying a particular topic. I anticipate students contributing future books in this series!

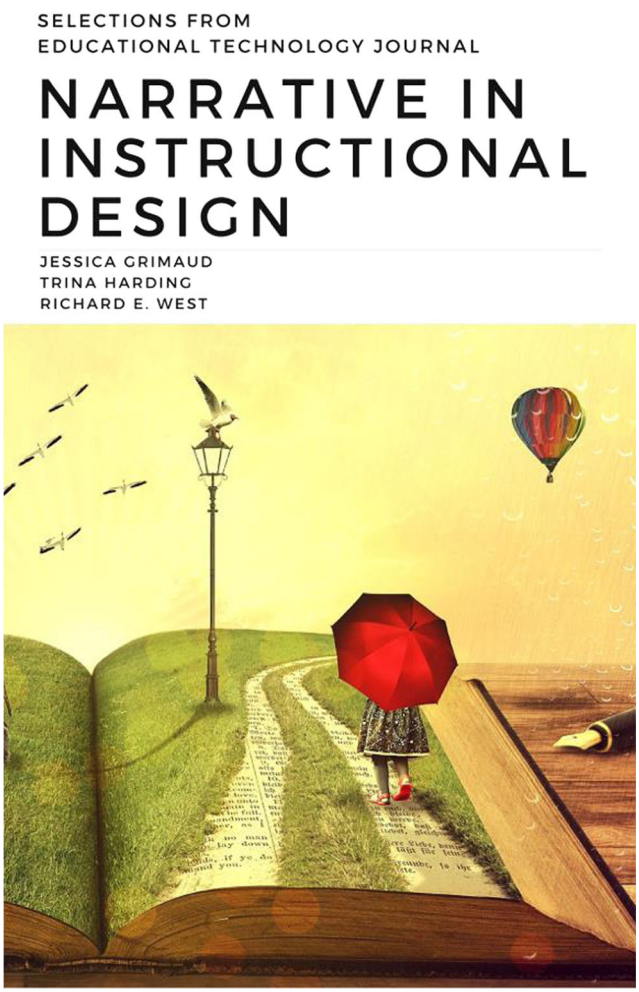

Fig. 7 Narrative in Instructional Design open access book

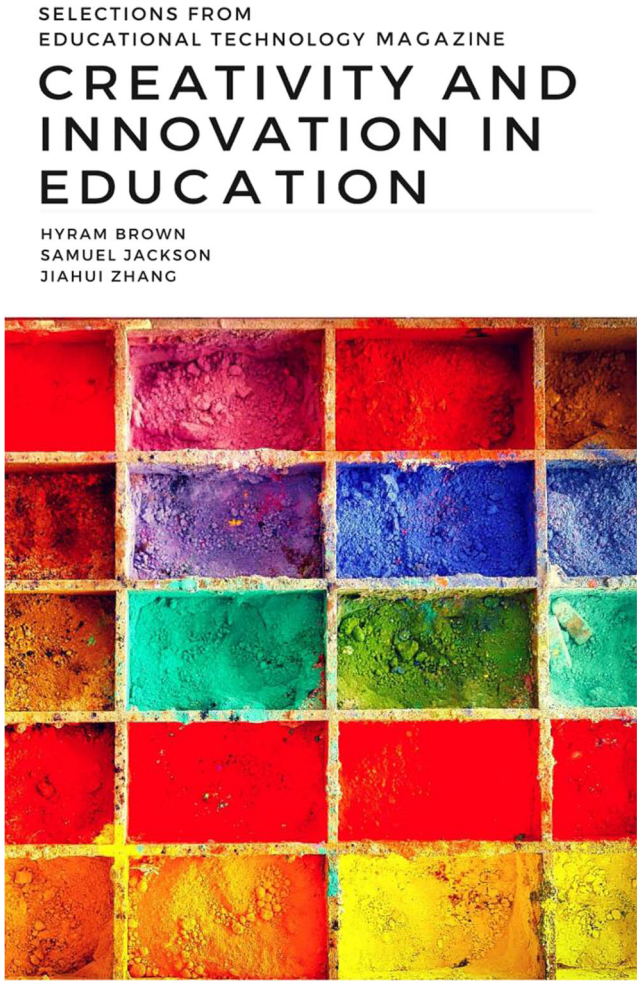

Fig. 8 Creativity and Innovation in Education open access book

Challenges and Recommendations for Other Book Creators

While I found the process of creating this open textbook very rewarding, it was certainly not without challenges. Following are some of the challenges that I encountered, followed by recommendations I would share with other potential creators of open textbooks.

Challenges to Open Textbook Creation

The biggest challenge was in finding material that could be repurposed. While publishing open access means material is not behind publisher paywalls, that does not mean it is easy to find. I believe in the area of open scholarship, one of our biggest current challenges is one of discoverability. We need better search engines and databases that can facilitate searching explicitly for openly available and openly licensed material that can be repurposes for projects such as this. Consider how simple it is to repurpose a CK-12 textbook (https://www.ck12.org/), so easy that at our university we ask preservice teachers to do it as

one of their easier assignments. Or consider how easy it is to find CC-licensed photos on Google Images or Flickr. We need similar types of resources to help discover open content for graduate education.

Second, once I realized there would not be enough already published, openly licensed material to reuse, I sent out a call for additional chapter submissions. This was very fruitful, but also presents challenges in how to recruit the best authors for each topic, and how to advertise and get the word out. In the end, I am certain many people did not know about the opportunity to submit a chapter for this book who might have been interested if they had known.

Third, there is no doubt that traditional publishers provide a great service in simplifying the book creation process. In developing the book myself, I became not only the editor, but the copyeditor, typesetter, graphic designer, marketing specialist, and publisher. Whew!

Fourth, while tools such as Pressbooks simplified much of the process, there was still some technological challenges. For example, it was difficult sometimes to export the Pressbook and maintain the visual design I wanted. Other tools make visual design very easy, but do not handle the book creation process as smoothly as Pressbooks. Thus, it seems we still lack an easy publishing option for handling the difficult technical challenge of publishing online in media-rich e-books as well as offline printed copies.

Fifth, open publishing raises interesting questions about scoping a project like this. On the one hand, because it is openly published on the web, there is no limit to the amount of chapters that could be included. However, I wanted the chapters to all be of good quality, and be useful to students, so I created the artificial requirement that the book be short enough to be read within a semester—so that a course could be developed to follow the outline of the book. The only exception is the careers section of the book, where I felt the number of chapters could grow because students would likely choose to only read a couple that interested them. I also required that chapters be short, usually around 4500 words, so that a teacher could assign 2–3 in a week. I still worry that the book is too long, but I specifically chose not to make the book an open repository of a hundred comprehensive articles about the majority of important topics in the field. It would be worthwhile to have that, but I felt it would be a different type of project.

Sixth, it is unknown how much this effort may "count" towards tenure and promotion. Currently, my college has a process for tiering publications, and this textbook does not even count enough to be tiered because it lacks the prestige of a publisher, the rigor of peer review, and influence of being indexed in traditional scholarly databases. For young assistant professors, this could be a significant challenge. It was also a challenge for me in recruiting chapter authors. I recognized this was mostly an act of service, and thus had to be flexible on deadlines and the amount of revisions I could request.

Potential Solutions and Recommendations

Some of these challenges are embedded in the nature of this kind of project, but I did discover a few ideas that may help other editors of similar open textbooks.

First, I found that it was helpful to reach out to specific authors and request that they submit a chapter proposal. Once a few of these authors committed to the project, it was useful to list them in the Call for Chapters to encourage other potential authors that this project was worthwhile.

Second, it was essential that I find good assistance in managing the project. Creating this book would have been much more difficult without the help of many great and skilled students. I hired two different students with previous copyediting and book creation experience to assist as editors (Tanya Gheen and Karen Arnesen). They helped in finding appropriate chapters, revising openly licensed material (for example, from undergraduate textbooks) for inclusion, and copyediting new article submissions. Jon Thomas created the book cover as an assignment in his visual design course. Joshua Hveem and Jiahui Zhang helped with formatting and technical tasks. I also created assignments for students in my courses to write the biographical sketches for authors, create multimedia materials, and submit quiz questions for each chapter to create a quiz item bank for instructors. In these projects, not only were the students helping me, but they completed authentic tasks that provided them with effective learning experiences, portfolio pieces, and a deeper connection to the professional community and richer understanding of the course topics.

Third, I am instituting measures to collect data on the book's usefulness to help with getting "credit" for myself and the chapter authors at our various universities. This includes embedding Google Analytics for each chapter, including a student response survey at the end of each chapter, and applying for an ISSN and DOI. This data will hopefully assist in establishing greater recognition for the quality of the chapter contributions. In future editions, a blind peer review system for chapters would assist in establishing greater rigor (West and Rich 2012).

Conclusion: the Importance of Open and why Are We Not Doing it?

While the textbook needs to be improved in many ways, I believe this has been a successful venture. The small sample size of students using the pilot version of the book appreciated that the book was free, and indicated preferring it. Authors have been enthusiastic, and initial feedback has been positive.

For myself, I found many benefits to creating and using this book. First, I was able to customize it to the course I was teaching. Second, because it is free, I do not worry about cash-strapped students cutting corners by not purchasing the book, borrowing it from someone else, and perhaps minimizing

their reading. Third, because it is free, I can share it with prospective students interested in the field who frequently ask me, "what can I read or do to start learning about your field?" Fourth, because it is primarily online, I can make edits, corrections, and enhancements quickly. Fifth, because it allows for the chapters to be licensed creative commons, it was easier to recruit authors knowing they could retain the rights to their chapters. Sixth, the embedded analytical measures provide feedback on each chapter, guiding future book development.

If the experience has been positive, why do we not have more open textbooks in our field? It was surprising, and disheartening for me to realize how little open access/openly licensed material was available in our field. This is even more troubling because out of all the disciplines, ours should be vested in promoting open materials. In many ways, I feel we have applauded the efforts of David Wiley and others who have carried the flag for open educational resources for K-16 education, but have not taken the initiative to heart in our own work. Much of the reason for this, I am sure, is because of incentive structures at universities that privilege traditional publication outlets. However, I believe we can—and should—push back on these incentive structures to argue for the legitimacy of open publication. This may require some creativity on our part to create better ways of measuring the rigor, impact, and prestige of open publications (West and Rich 2012). But in the age of alt-metrics (Rich and West 2012), this should be possible. In addition, organizations, such as the Association for Educational Communications Technology, should help with discoverability of these open materials, which Frydenberg and Matkin (2007) found to be one of the top barriers to the adoption of these books. If authors are to contribute chapters for open books for free, their only payment will be visibility and citations, and organizations can assist in this regard by increasing their visibility.

One of the greatest benefits I have seen from creating these open books is that they are, of course, open to anyone to read. I frequently have potential students contact me, asking what they can read to become acquainted with the field. Since there are rarely undergraduate programs or courses in our field, there are few opportunities for students to "try us on for size" before committing to a graduate program. Thus, interested students are hungry for something that can introduce them to the field with low initial cost to themselves. Before I recommended books that may have been too academic for an investigating newcomer, or that were difficult to find or expensive to purchase. Or I recommended articles that were unavailable behind publisher paywalls—which were difficult for potential students not currently aligned with a university to access. I am glad to now have a different answer, as I can now recommend this book as an accessible introduction. As a field, I hope we can focus on supporting more openly accessible publication outlets, not only so we can read and access the material more easily—but also so our students and prospective students can.

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