



The Open Revolution

An Environmental Scan of the Open Textbook Landscape

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August 10, 2009

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Executive Summary

The cost of textbooks has long been an area of concern for students, professors, and administrators. Students in higher education spend over \$900 a year on textbooks, amounting to roughly 20% of the cost of attending a four year public institution (Zomer, 2007). Many students cannot afford the cost of textbooks, and are forced to decide between paying tuition and purchasing the necessary textbooks for a course. As Internet use skyrocketed, textbook publishers began developing electronic textbooks, which ideally would have decreased the cost of textbooks. Electronic books have not decreased costs significantly, however, and in some cases may increase costs for students. Over the last decade, the prices of textbooks have increased at roughly four times the rate of inflation and will likely continue to increase in the foreseeable future (Zomer, 2007).

Concerned individuals have recognized the problem of rising textbook costs and have actively developed new open textbooks. Open textbooks are textbooks in electronic form that are freely available and accessible to anyone with an Internet connection. The open textbook landscape is not monolithic and fixed. There are many open textbooks published across an array of platforms and content continues to be developed. This white paper serves as a synchronic environmental scan of the current open textbook landscape, examining five open textbook platforms: (1) Wikibooks, (2) Connexions, (3) Flat World Knowledge, (4) The Global Text Project, and (5) Textbook Media. These five platforms share some features but are useful for different purposes.

While this white paper analyzes these five platforms in depth, a few findings are worth pointing to in this summary:

- Connexions and Flat World Knowledge both provide professors with high quality open textbook options. These two platforms follow very different models. Connexions uses a modular format where content is chunked into nonlinear modules and professors can combine modules to form collections that function as full textbooks. Flat World Knowledge features full textbooks that are in final form, ready to be adopted for classroom use.
- These different models will appeal to different users. Professors interested in additional flexibility can draw from the wealth of Connexions modules and create flexible textbooks to match their courses; however, compiling collections will result in more up front work for professors. Flat World Knowledge provides full textbooks for professors interested in adopting a more traditional textbook format. These textbooks do not require the work necessary to compile a Connexions textbook, but they provide professors with less flexibility.
- Wikibooks can be used as a valuable open textbook tool in a constructivist classroom. Professors can encourage students to actively construct their own knowledge by having them use the Wikibooks platform to create their own textbooks. Projects that have used this approach have found encouraging results.

Introduction

The textbook market has been a source of controversy for over a decade. Individuals, educational institutions, consumer rights organizations, and legislative bodies have all called for textbook reform. These groups recognize that textbooks are a vital piece of the education system, a vital, *expensive*, piece of the education system. Students need access to high quality textbooks to succeed in school, and the rise in textbook prices has made it impossible for many students to afford those textbooks. This problem of access has given birth to a move towards open textbooks. Open textbooks are textbooks that are available for free online. They come in many forms and are sponsored by many institutions. This paper provides an environmental scan of the available open textbook platforms, making recommendations on the platforms that may be the most valuable for the future development of open textbook materials. To situate the importance of the open textbook movement, this paper first describes just how damaged the traditional textbook market has become. Because the problems with the textbook market have been covered in great detail in myriad sources, I only briefly address the problems with the market. There is a strong body of literature analyzing the problems with the textbook industry (Fairchild, 2004; Zomer, 2007).

The major complaints against the textbook industry revolve around the price of materials and frequent turnover of editions. The price of textbooks has increased at four times the rate of inflation, and the average student now pays over \$900 a year for textbooks. The \$900 a year students spend on textbooks amount to 20% of annual tuition and fees at a four-year institution (Zomer, 2007). These high prices make the cost of purchasing textbooks prohibitive for many students; consequently, they are often faced with the decision to either not pay tuition or take

classes without purchasing the assigned textbooks. The high prices are exacerbated by the push in the industry to release new editions every few years; a practice that has been widely criticized by student rights groups. The release of new editions makes old editions obsolete, effectively limiting students' options to buy used versions of textbooks for cheaper prices.

Of course, there are two sides to the coin. Textbook companies argue that the rise of digital marketplaces for used books such as Half.com or Amazon have cut into profits because publishers only make money the first time a book is sold. Students can go online and buy cheaper, used versions of textbooks as easily as they can buy the new version. In addition, the textbook publishing industry has faced the same problems with piracy as both the music and movie industries. Individuals copy textbooks and distribute them illegally online, a practice that undoubtedly cuts into publishers' profits.

The purpose of this paper is not to defend or condemn the textbook industry; instead, this paper identifies current platforms for open textbooks that can help solve the problems associated with traditional textbooks. Before moving on to identifying open textbook platforms, it is important to note that open textbooks are not synonymous with electronic textbooks. With the rise of the Internet, the market for electronic textbooks has grown. Like with the move to electronic academic journals, advocates hoped electronic textbooks would provide access to cheaper materials. Electronic textbooks have not led to significantly cheaper textbooks and likely never will. Publishers do provide electronic textbooks at lower cost, but those textbooks are then often only available to students for a limited time, and the students cannot sell them back through University bookstores or online marketplaces like Amazon. Taking into account the money students receive from selling back print textbooks, electronic textbooks are often not a cheaper alternative. Furthermore, because electronic textbooks are licensed to students for a limited

period, there is no market for used electronic textbooks. Electronic textbooks have to be purchased from publishers, further increasing costs for students.

Open textbooks are almost always provided in electronic form, but they do not have licenses limiting the period of use and they are provided to students free of charge. Like with other open resources, whether they are open source software programs or open access journals, the quality of open textbooks varies greatly. Some open textbooks are of equal or higher quality than traditional textbooks, and some are not. There are also different platforms people can use to create open textbooks and institutions and companies use different business models to provide open textbooks. This paper analyzes five open textbook resources: Wikibooks, Connexions, Flat World Knowledge, the Global Text Project, and Textbook Media. The first three are likely the most interesting resources because they are most applicable to the academic textbook environment, contain the most robust content and delivery systems, and have the most long-term promise for influencing open textbook development. The fourth, the Global Text Project, will likely not be of as much value for professors interested in assigning an open textbook for class, but it is included in this review because it provides professors with an easy opportunity to make a valuable contribution to the open textbook movement. The final example, Textbook Media, will also not be as useful for interested parties as the first three. Textbook Media is included in this market assessment because it offers an example of an alternative business model that could play a role in the open textbook movement.

Because of the diversity of the open textbook landscape, this review cannot be comprehensive. The next section discusses the scope of this paper and addresses the current open textbook landscape in more detail, arguing that the current spread of resources might negatively affect the growth of open textbooks.

Scope

Before moving on to the open textbook landscape, it is important to make an important distinction between Open Educational Resources (OER) and open textbooks to avoid confusion. The OER movement harnesses the affordances of digital media to provide free educational materials to anyone interested in using them. One of the most well known OER repositories is MIT Open Courseware, which provides users with a multitude of valuable educational resources, ranging from PowerPoint presentations to online quizzes and syllabi. OER is basically an umbrella term for all free, openly available educational resources, and open textbooks fall under that umbrella. This paper only focuses on open textbooks and platforms that are used to produce and store open textbooks. Readers should keep in mind that there are many OER resources not mentioned in this paper that provide freely available educational materials.

The scope is also limited by focusing only on resources that provide open textbooks for higher education. Discussions about open textbooks occasionally conflate K-12 and higher education, but as Frydenberg and Matkin (2007) point out, “these two realms are so different that any discussion of open textbooks requires that the context of the discussion be defined as being in one or the other of these domains” (p. 16). The issues surrounding K-12 textbooks are different from those surrounding higher education textbooks, and the resources available for development of K-12 textbooks are different as well. For a more detailed discussion of these differences, see Frydenberg & Matkin (2007).

Open Textbooks Environmental Scan

Even a surface scan of available open textbook options reveals too many open textbook projects to describe in a single paper. Taking advantage of the Internet as a distribution medium,

individuals have begun creating open textbooks on individual platforms and making them accessible and affordable on personal websites; however, the current diversity in the open textbook environment could be a weakness rather than a strength. Echoing Borgman's (2008) arguments about the need for Institutional Repository standards and interoperability, the current open textbook landscape features material spread out too thinly over the Internet.

Opentextbook.org attempts to rectify that problem by providing a searchable registry of open textbooks. A professor can search the site and find links to open textbooks, but the search does not include content from large open textbook platforms like Wikibooks, Connexions, or Flat World Knowledge. Instead, the repository links to smaller sites. These external sites are occasionally sponsored by institutions, but they are often sites maintained by individuals.

Relying on individually hosted sites for a course textbook could be risky because the site's hosts may not maintain content or may not fix problems that occur with the site. In addition, spreading the wealth of open textbooks over individual nodes in the network makes it more difficult for people to find the resources, leading to a problem of distribution and discoverability (Frydenberg & Matkin, 2007). There is currently no system in place or metadata standard that allows for comprehensive searching across open textbook platforms.

There are two viable solutions to this problem. The first is the development of a metadata standard similar to the OAI-PMH protocol for metadata harvesting used for open access academic literature. Standardizing metadata across open access repositories and journals allows search engines like OAister to search across open access journals and repositories. As Borgman (2007) points out, creating open content does not make a difference if there is no way to find that content, and interoperability across platforms is the only way to make open content easily accessible. Borgman identifies the practice of author archiving on personal websites as a possible

problem because once that article is archived it will likely not show up in any exploratory search. The same problem is beginning to arise regarding open textbooks. Too many projects have created open textbooks across too many platforms for a professor performing a casual search to access most of the available resources. The creation of a metadata standard and a search engine like OAister would help solve this problem. Being able to search by research area or course name to access all the open textbooks on that subject would be an invaluable resource for interested professors and students.

The other way the problem can be rectified would be to move existing valuable open textbooks to a central platform and publish new work on the same central platform. Rice University's Connexions would likely work well as a host for a large majority of open textbooks. Connexions is discussed in more detail below, but first it is important to highlight some of the possible advantages of moving the majority of open textbook resources to an established platform. Developing a standard metadata for all open textbooks would make open textbooks more accessible, but it would require the creators of the textbook to be aware of the metadata and know how to use metadata, and it will not solve the problems associated with small, personal websites. A professor who chooses to assign a textbook for a course has to have some assurance the textbook will remain online in a usable form for the duration of the course. Textbooks hosted on individual website may not remain accessible. Either the author may take the site down, change the content, or a simple JavaScript error or broken link may make the textbook unusable in the middle of the semester. In addition, textbooks hosted on individual sites rarely provide the functionality found on larger platforms like Connexions. Research shows many students prefer to print textbooks rather than access them solely online (Vernon, 2006), and print on demand is not an option with most individually hosted textbooks. Connexions, on the other hand, does provide

users with the option to pay a small fee to print a textbook with a print on demand provider. By hosting most content on Connexions rather than creating or developing individually hosted textbooks, users will benefit in three ways. They will (1) have a central platform on which to search for open textbooks; (2) they will have some reassurance that the textbook will remain in a usable form for the remainder of the course; and (3) students will be able to print on demand and choose from multiple versions of the book. The danger of moving content to a centralized platform is the chance the platform fails; however, if a majority of content was hosted on one central repository, that could centralize funding as well, going a long way towards assuring the platform's success.

The previous paragraph is not arguing that Connexions should be the only open textbook platform. Different platforms provide different services that can be used in different ways. The argument that open textbook material could be consolidated on Connexions pertains mostly to open textbooks published on individual and institutional websites and does not mean Connexions should be the only open textbook platform. Different platforms have their own strengths and weaknesses and will likely appeal to different groups. The following section analyzes five open textbook platforms: Wikibooks, Connexions, Flat World Knowledge, the Global Text Project, and Textbook Media. Which platform is of most interest to the reader depends on what the reader hopes to accomplish. For professors interested in developing open textbook materials, Wikibooks and Connexions should be the two sections they begin with. For professors interested in adopting an open textbook for a class, Wikibooks, Connexions, or Flat World Knowledge would be of most interest, and each section notes the advantages and disadvantages of each. For professors who are interested in contributing an out of print textbook to the open textbook movement, the Global Text Project section will likely be the most pertinent. Finally, Textbook

Media is included not so much as a resource for creating or adopting open textbook materials, but more to show that entrepreneurs are thinking of alternative business models that will work in an open textbook environment. Also, anyone interested can always choose to not use one of these platforms, instead publishing an open textbook resource on an individual or institutional site. There are many good open textbooks developed without using a publicly available textbook platform.

Wikibooks

Wikibooks is the most widely used open text platform and began in 2003, and currently has over 35,000 pages of material. The platform follows the same format as Wikipedia, allowing anyone to edit pages, whether he or she is a registered user or not. Because of its community based editing format, Wikibooks has the potential to be a truly collaborative educational tool. Thousands of users edit thousands of pages, some of which are in full textbook format. Other topics are addressed through module format. Because Wikibooks operates on the same platform as Wikipedia, the reader likely has some familiarity with how Wikibooks are created. The creation and editing process are the same as with Wikipedia.

Some research has pointed to Wikibooks format as the future of open textbooks (Cragun, 2007). The Wiki platform undoubtedly has advantages over other open textbook platforms. Because it uses the same interface as Wikipedia, users are familiar with the interface and editing and creating documents is streamlined and simple. Also, Wikibooks provides a truly collaborative environment in which anyone can contribute. There have been success stories of Wikibooks created by a large number of authors bringing expertise and manpower to a project.

Nonetheless, Wikibooks is not the best open textbook option for many classrooms. The reasons why are discussed in detail below

As with Wikipedia, the Wikibooks interface leads to obvious accuracy and authority questions. If anyone can edit any page, how can a student using the textbook know the information is accurate? While the accuracy of Wikipedia has been widely debated, it has not stopped Wikipedia from becoming a Web 2.0 crown jewel; however, the accuracy debate about Wikipedia cannot be imported directly to Wikibooks. Most professors agree that Wikipedia is not an authoritative source and should not be cited in academic papers. Students can use Wikipedia as a starting base for research, and if they find anything interesting in a Wikipedia article they can triangulate that information by finding the information used in more authoritative sources. The problem is that textbooks traditionally would have been one of those authoritative sources. Students should be able to rely on the accuracy of textbooks; they should not have to seek outside confirmation of the material they are reading.

The difference between using Wikipedia as a non-authoritative starting point and using Wikibooks as a foundational text are major. The difference is exacerbated by the smaller community of Wikibooks editors. Because Wikibooks and Wikipedia have the same editing interface, the risk of vandalism is always present. Any user can change any page, inserting incorrect information that could have major consequences for students using the textbook to study for a test. With Wikipedia, large communities of editors quickly correct incorrect information or vandalism. The Wikibooks community is much smaller, however, and with more specialized textbooks, the 'army' of dedicated editors may be small or nonexistent. Editors would have to devote a great deal of time to exercise adequate quality control over an extensive, textbook length Wikibook, increasing possible accuracy problems.

While Wikibooks does have the potential to be a socially networked, collaborative educational environment, research shows that contributions to Wikibooks typically follow the same 'long tail' as do contributions to Wikipedia (Ravid et. al, 2008; Wikipedia, 2009). In other words, while there are thousands of contributors to Wikibooks, a vast majority of those users likely contribute relatively little to the project. In their examination of a Wikibook created by the Israeli Open University, Ravid, Kalman, and Rafaeli (2008) found that an overwhelming majority of users edited the Wikibook between one and three times. One hundred and seventy users made one edit, 102 users made two edits, and 72 users made three edits. Comparatively, the study found that one user at the opposite end of the long tail made 384 edits; another made 200 edits, and another made 174 edits. This long tail distribution of edits follows the distribution of Wikipedia edits in which a small number of users contribute a large amount of content to the site.

The long tail effect will likely increase with academic Wikibook projects compared to Wikipedia projects. A textbook on a specialized academic subject, even a textbook on an introductory subject, requires more expert knowledge than most Wikipedia articles. For example, an individual who knows how to use a basic search engine can do basic research and contribute valuable material on topics that only require surface encyclopedic information. The same user will have more difficulty doing basic research to contribute valuable, accurate information to in-depth, chapter length articles on complicated theories like symbolic interaction or complicated mathematical formulas. This possible problem points to the key difference between a Wikipedia articles and Wikibooks: the length and depth of a module.

The success and growth of Wikipedia is predicated on the modular form each article is supposed to take. By breaking down an article into multiple, short sections, a user can add sections or add content to existing sections quickly and with a minimum amount of effort.

Chapters in textbooks do not function the same way. Even if a chapter is broken into multiple subheadings, as many chapters are, the subheadings still often contain pages worth of text, not a few paragraphs worth. Adding a three sentence section on a recent event is much less imposing than adding an entire chapter or subsection to a book. The structure of textbooks, at least the structure of textbooks as we currently understand them and as they are currently being developed on Wikibooks, makes it likely that casual users will not be able to contribute greatly to the formation of the book.

Another key problem with the Wikibooks platform is a lack of authorial attribution. Authors who contribute content to Wikibooks do not have control over that content, and they do not receive credit for that content. Because they are producing in-depth, time intensive texts for free, the problem of attribution becomes even more pronounced. The amount of money authors receive from textbooks is often very small, but they do gain social capital from creating textbooks. Wikibooks often takes away that social capital by making it unclear who performed the bulk of the work producing the texts. Free-software communities exemplify how gift economies can encourage volunteer work and the development of free products through a “reputations based gratification system” (Monge et. al, 2008, p. 197). Wikibooks does not provide that gratification system, making it unlikely that many authors will devote the time necessary to develop course-length textbooks. As Monge et. al (2008) state in no uncertain terms, “Author recognition is a key factor to obtain participation in a community” (p. 197).

Wikibooks also lacks some of the functionality of the platforms described below. Most Wikibooks do not have a print on demand option, and students who want a print version would have to go through each link and print the sections individually. Research shows how important it is for students to have the option to pay a little extra to print their textbooks (Vernon, 2006),

and that option is not available with the majority of Wikibooks. Hopefully, as the number of Wikibooks continues to grow more will feature an easy to use print on demand feature.

The preceding argument is not that Wikibooks is a bad platform for creating open textbooks. The Wiki interface has revolutionized the way we view community, collaboration, and production. As an open textbooks platform, however, Wikibooks has 5 key problems:

1. Accuracy
2. Collaboration is overstated in many cases
3. The length of textbooks does not work as well with Wikipedia's modular format
4. Authorial Attribution
5. End-user functionality

Until recently, users had to deal with these problems because Wikibooks was the best open textbook option. Now, the Connexions platform addresses all five of these problems. Therefore, unless authors are working on a huge, collaborative project, they will be better served by using Connexions rather than Wikibooks as the platform to publish their work.

Though Wikibooks may be problematic as an open textbook platform, it can still be an invaluable open textbook tool. Professors can use Wikibooks to facilitate a constructivist approach to learning, urging students to play an active role in knowledge creation and open textbook development.

Wikibooks and the Constructivist Classroom

While Wikibooks might not be the best option as a stand-alone open textbook system, the platform is a valuable tool for constructivist approaches to teaching. In a constructivist classroom, students play an active role in their education (Marlowe & Page, 2005). Rather than embracing the top-down hierarchical approach to learning where the professor and the authors

she assigns serve as experts and the students absorb their information, constructivism encourages students to actively engage with information and construct knowledge. The constructivist approach does not disregard expert knowledge; rather, it encourages students to work through issues rather than absorb them from experts as a series of facts. The approach has been embraced by many educators who have realized that new Web 2.0 technologies lend themselves to a constructivist approach. Because of space constraints, this paper only briefly addresses how Wikibooks can be used as an open textbook platform in a constructivist classroom (for a more in depth discussion, see Parker & Chao, 2007).

The most common approach has been to use Wikibooks (or other Wiki formats such as Wikitexts) to allow students to actively construct a class textbook. O'Shea et al. (2007) implemented a project in which 219 students from multiple sections of a class were asked to develop a textbook covering 75 topics. The students were also allowed to contribute content on "wild-card topics," i.e. topics outside the 75 chosen by the instructor. Each student had to contribute a 1,000 word article on one of the topics, citing at least five outside sources. After a student posted an article, the other students in the sections were allowed to freely edit the content and comment on the content.

Echoing the findings of other studies (de Pedro et. al, 2006), O'Shea et al. (2007) found that the Wikibooks experience was a positive one for the students. Rather than rely on an expensive existing textbook, the students did outside research and created their own textbook. They contributed articles and edited other students' articles. The study found that, despite initial unease on the students' part, the majority regarded the Wikibooks experience as valuable. The end result was a collaborative textbook that encouraged active involvement in the learning process.

Wikibooks Copyright

Wikibooks are published under the GNU Free Documentation License (GDFL). The GDFL is a copyleft license, which requires that all copies or derivations of work under the license must be made available using the same license. Users are allowed to reuse documents published under the GDFL for any purposes as long as they publish their work under the GDFL and give attribution to at least five of the principal authors of the original document. If users modify the original document, they must make it clear the document has been modified. They must also preserve a history section of the document allowing users to access the original and see what has been changed.

Connexions

The Connexions project began at Rice University in 1999 and has become one of the pioneers of the OER movement. Unlike other Open Education Resources (OER), such as MIT's Open CourseWare, Connexions plays a dual role: it is both platform and repository. Users can create content using the Connexions platform and also store that content on Connexions, making it freely available to any interested party. Unlike OER repositories like MIT's Open Courseware, Connexions is not a repository for all kinds of educational materials. Rather, Connexions is a repository focused on open textbooks (Baraniuk, 2006). The majority of content available on Connexions is in modular format; every module in Connexions should be able to be used as part of a larger course textbook.

Borrowing a taxonomy of contribution models from Monge, et. al (2008), Connexions uses an open contribution model. In an open contribution model, anyone can register as a user, and any registered user can contribute content. Notice the key difference between this model and

the Wikibooks model. With Wikibooks, *any* user, registered or not, can edit Wikibooks documents. That results in a system that allows anyone to contribute and makes authorial attribution problematic. With Connexions, only registered users can deposit a module, and those users then receive attribution for the module. As this paper discussed earlier, authorial attribution will likely be a key piece of most successful open textbooks projects, and Connexions provides very clear attribution identifying who created each module. Connexions also provides authors with final version control, unlike Wikibooks. Other users can adopt the module as part of their textbook and then make changes to the module, but despite the changes, the original authors retains attribution, and the changes do not affect the module in the Connexions catalog. The additional power of control and attribution Connexions provides authors is a strong point of the platform.

So how does Connexions work? Connexions allows any registered user to create a module and then deposit it with Connexions. The platform provides users with a personal workspace where they can create content, and it features a number of interesting collaborative tools. The most basic is a tool that allows for collaborative authorship; if authors collaboratively author a module, both their names are attached to the module. Users can also suggest changes to the module by contacting the author. The author can then choose whether or not to make those changes. If the author does not make the changes, users can make a copy of the module, change it, and resubmit it to Connexions. The new module does not replace the original module, it instead becomes a derived copy. With a derived copy, the original creator still receives attribution for creating the original module and users are notified that the content has been modified.

Advantages/Disadvantages

The modular format is a strength of Connexions, and all authors are encouraged to create content that is nonlinear and modular. Because the ideal module can stand on its own, professors can go through all the different Connexions modules and compile their own collection in any order they choose. After professors compile a personalized module collection, they can then use that collection for their courses. They can also resubmit the collection to Connexions and receive attribution for creating the collection. The author of each module also receives attribution, even if users changes some of the content in the module.

Connexions currently has almost 9,000 modules woven into over 450 collections. The amount of content in Connexions is almost certainly due to the liberal contribution model. Anyone who registers can contribute content easily, and many professors, institutions, and part-time teachers have taken advantage. In some cases, these contributions have been compiled into collections that rival the quality and depth of any traditional textbook. Connexions' *Collaborative Statistics* textbook, for example, was created by two faculty members at De Anza Community college and is the same quality as traditional statistics textbooks. Professors who adopt the book can adopt it in its current form, or they can change the order of the modules, delete certain modules, or add modules. Most of the content in Connexions, however, is not in as complete a form as *Collaborative Statistics*. Much content exists only as modules and has never been published in a collection.

The inchoate form of much of Connexions' content is not necessarily a weakness though. Dedicated professors can compile a collection from existing modules that fits the structure of their classes perfectly. The platform's flexibility allows professors to make sure their texts do not have information they will not be covering and it lets professors teach courses in a nontraditional

manner. If a biology professor feels her class might benefit from a section on chemistry or scientific communication, she can find germane modules and add them to her textbook.

Compiling a textbook from existing modules will obviously result in more upfront work for the professor, but the increased flexibility could lead to a personalized textbook perfect for the class.

An important issue to address with the Connexions platform is quality control. Like any open platform, the quality of Connexions' content is variable. To truly control the quality of each module in Connexions, there would have to be an editorial gate keeper, which would harm the open nature of the platform. Instead of authoritative editorial control, Connexions relies on a lens system. What is the lens system? Think EBay. On EBay, buyers rate sellers and endorse them, and those ratings and endorsements show new buyers they can trust the seller. Lenses work through a similar endorsement model. There are four levels of lenses. The most basic is the members' lens, which is an individual endorsement. The most rigorous lens is called the endorsement lens. Connexions describes the endorsement lens as the following: "Organizations, such as professional societies, can create endorsement lenses containing content they have carefully reviewed and deem to be of high quality" (Connexions-Lenses, n.d.). Modules that have been widely endorsed by members' lenses, or endorsed by an endorsement lens, are likely to feature accurate content. Just because a module has not been endorsed, however, does not mean the module is not of high quality. The module might be new, or it might have simply fallen through the cracks.

The lens system will result in more work for professors compiling textbooks. While lenses work to give content some authority, endorsements are not the same as editorial control. Whereas a professor using a traditional textbook likely does not have to go through the textbook to check for accuracy, professors using Connexions modules will have to make sure the

information in the modules they assign is accurate. Authorial attribution and the lens system will increase the accuracy of content. Nonetheless, adopting content from an open platform will mean the professor has to perform her own final quality control. Each professor will have to decide if the extra work is worth the cheaper prices and the additional flexibility.

Connexions Copyright

Work published on the Connexions platform is published under the Creative Commons Attribution license (Creative Commons Attribution 3.0, n.d.). The author retains copyright to the work and agrees to make it freely available for others to use. The goal of the license is to let the author retain attribution and some control over the work, while also making it freely available for anyone to access, share, and create derivative works. Anyone who creates a derivative copy of the original work must give the original author credit. If the original author does not approve of the changes made to the derivative work, she can ask for her name to be removed.

Flat World Knowledge

Flat World Knowledge (FWK) uses a different textbook model than traditional textbook publishers or other fully open models like Connexions or Wikibooks. Formed in 2007 by two veterans of the textbook industry, FWK is a commercial venture that hopes to profit by providing free, open textbooks. To help understand how FWK hopes to attain profitability and how it differs from open textbook projects like Connexions, the business model is outlined below. In one sense, FWK follows the publication model of traditional textbook publishers fairly closely. As one article describes it, “Flat World would become a publisher—commission, edit, and peer review the books—but it would give its titles away free on the web.” (Anderson, 2008). Notice the differences between the FWK model and the model followed by Connexions and

other open textbook platforms. With FWK, authors are specifically commissioned to produce content. This is not the open platform of Connexions; instead, it is much closer to the traditional publisher model. Textbooks produced under FWK contracts are produced in a nearly identical manner to traditional textbooks. They are not collaborative texts in the same way Wikibooks, and to a lesser degree Connexions, are. They are produced by authors targeted by FWK, and the texts are then edited and published online by FWK staff.

While FWK has been bolstered by over \$8 million from investors (Park, 2009), one of the key issues going forward for the FWK business model is whether providing free textbooks can be profitable. The FWK model provides completely free electronic versions of textbooks; the profit will ideally come from the sale of print on demand versions of the books and reasonably priced supplemental education materials such as quizzes and flashcards. The first barrier FWK has had to overcome was convincing its first wave of authors that the FWK model will be profitable.

Unlike with other open platforms, the authors who create textbooks for FWK hope to make money from their work. The following is an outline of how authors hope to make money from publishing a textbook with FWK (this analysis is adapted from Kottke, 2008):

- An author typically signs a contract with a publisher assuring the author 15% of the textbook royalties. Those royalties only cover purchases of the new book. They do not cover any kind of photocopying or money made off used book sales.
- When a new textbook is assigned in a class for the first time, 80% of the class typically purchases the book
- The second semester the book is used, only 45% of students purchase that book. By the fourth semester the book is used, there is virtually no market for the book.

With the traditional model, authors will likely receive the vast majority of their royalties within the first year of publication. The FWK model operates differently. In the FWK model, authors are given 20% royalties. The profit they make off the books comes from print-on demand, kindle versions, flash cards, study guides, and other ancillary materials (Anderson 2008). Ultimately, because FWK materials are provided at such a low cost, the model expects that royalty payments will be lower in the first semester the book is used but will not tail off nearly as quickly as they do in the traditional text book model. Whether that ends up being the case or not remains to be seen. The brief history of the Internet is littered with failed business models hoping to make money from 'premium content.' As creator Eric Frank has acknowledged, at this point FWK has had to sell prospective authors on "the vision" rather than actual profit numbers. The early return has been promising though. FWK has published six full texts, and currently has another 21 authors under contract.

Advantages/Disadvantages

While FWK provides free textbooks, the platform is radically different from other open textbook platforms like Connexions or Wikibooks. First, FWK texts retain the authority of typical textbooks. Because FWK acts as publisher and not just compiler, it actively chooses whose texts to publish, explicitly giving a stamp of approval to the material on the website. FWK also copyedits and reviews each textbook it publishes, assuring a certain level of quality control. Because FWK provides the texts with authority and assures quality control, professors interested in using FWK materials can do so with little effort. Professors can be fairly certain a text they find on FWK will be high quality and include correct information. They will still have to look through the text, but no more so than they would have to when considering a text from a traditional publisher.

The oversight FWK provides can be an advantage in another way: all texts published on the FWK website are in complete form. The final form means professors can adopt a book for class with a minimum amount of effort. Connexions, to a lesser degree, also offers that option. The strength of Connexions, however, comes from allowing the user to actively create a textbook from existing modules or pieces of existing textbooks. In most cases, the users will have to actively create a textbook whether she wants to or not because most ‘Collections’ on Connexions are not nearly as in depth as FWK’s textbooks. With FWK, a professor can find a textbook, make sure it is of high quality and that it covers the course material, and then assign the textbook. Once it is assigned, it functions nearly identically to other electronic textbooks, and students then choose what they want to pay and what format they prefer to access the book. Adopting a book from FWK will likely be no more work for a professor than adopting a book from a traditional print publisher.

Both the advantages discussed above, however, can be seen as disadvantages as well. Because FWK targets authors, signs them to contracts, and then provides editorial control, FWK textbooks should be of similar quality to traditional textbooks. The downside is that the process of developing books is slower than with other platforms. Whereas Connexions lets any author contribute modules, FWK retains authority at the expense of output. Looking at the current FWK catalog illustrates the disadvantage of editorial control. Currently, FWK currently has six books available, with 21 other books under contract to be released at a future date. Even after those 21 books are released, only 8 subject areas—Accounting, Communications, Economics, Finance, General Business, Information Systems, Management, and Marketing—will be covered by the catalog. If a professor is teaching a class that FWK provides a textbook for, the editorial control and authority of the FWK system will be an advantage. However, the number of classes covered

by FWK is extremely limited, and the business model will likely keep the number of books from growing quickly. Until the first generation of FWK textbooks show they are profitable, it will likely be difficult for FWK to dramatically grow its operation and produce a large number of textbooks. The quality control FWK provides means a lack of breadth at least for the near future.

The second advantage—the final, complete textbooks FWK provides as compared to the modules in Connexions—makes it easier for professor's to adopt the books, but it results in a lack of flexibility. Currently, there is no way for a professor to draw from different FWK textbooks to mix and match modules. Professors can choose to delete chapters from an FWK textbook, but they cannot currently add chapters. Some professors will find the completeness of FWK textbooks appealing because they can adopt the book as is, without actively constructing the format of the book. Others, who are more interested in designing their own textbook from existing material, will be better served by a combination of Connexions modules and other Open Educational Resources.

Copyright

Flat World Knowledge publishes its work under a Creative Commons License (personal communication with Liz Weir, 4/3/09). In the future, people will be able to edit Flat World Knowledge textbooks and insert or delete material from sections. Professors can already choose to delete chapters or rearrange chapters.

The Global Text Project

The Global Text Project is a joint venture between two colleges at the University of Georgia and the University of Denver. The goal of the project is to “create a free library of 1,000 texts for students in the developing world” (FAQ|The Global Text Project, n.d.). The project was

created when a University of Georgia graduate class taught by Richard Watson developed an open textbook called *XML-Managing Data Exchange*. From there, the project has grown to include over 40 textbooks, and at least ten new textbooks are in preparation.

The Global Text Project is nonprofit and received a generous grant from the Zurich based Jacobs Foundation to cover its startup costs. The project is now looking for institutions, individuals, or corporations to sponsor its textbooks. The project estimates that a corporation should expect that sponsoring a new textbook will cost around \$50,000; after the book is created, sponsorship for the book will likely cost \$25,000 annually to sustain it (Books| The Global Text Project, n.d.). The Global Text Project expects that corporations that choose to sponsor books will derive some benefit from their investment. A sponsored textbook will carry a prominent acknowledgment of the contribution of the sponsoring party, identifying that corporation as a supporter of open textbooks for developing economies. It remains to be seen how much sponsorship money the project receives in this faltering economy, but hopefully the Global Text Project will receive the sponsorship it needs to provide textbooks to the developing world.

Students in the developing world are not the only ones who can benefit from the Global Text Project. All of the textbooks are available to everyone. They are in PDF format, and the collection includes work from a number of different subjects. The project is setup in a similar way to Flat World Knowledge, and all of the available textbooks are edited and in complete form. Members of the staff recruit editor-in-chiefs, who then lead the creation of specific books. They can either write the chapters of the textbook or recruit other people to write chapters or sections. The project is also looking for people to contribute by copyediting or by creating exercises and quizzes. Anyone interested in helping the project, whether the contribution is

minor or major, can contact members of the staff to inquire about how to help. The resources section at the end of this paper includes the contact addresses of the two heads of the project.

A relatively simple way for a professor to contribute to this project is to contribute content that has gone out of print. Many textbooks that have gone out of print are still valuable, particularly to students in the developing world. Often, the authors own the copyright for the book and can contribute that content to the Global Text Project. Even if the author does not own the copyright, publishers are normally willing to contribute out of print content. Ideally, the contributed content would be in digital format, but even if no digital form is available, the Global Text Project is willing to scan relevant out of print textbooks and make them available. Like with monographs, the majority of textbooks are out of print, and these resources could prove invaluable to educational communities in the developing world. The Global Text Project provides a wonderful opportunity for professors to contribute to an important humanitarian project.

Professors can also assign these textbooks for their class. The newer books have been completed collaboratively by subject area experts, and they have been edited by volunteers. Like other open textbook options, professors should examine the content to make sure it is of high quality; however, the editorial process currently in place should assure that most of the textbooks will be accurate and well written. The textbooks also are all in complete form, so it will not be difficult for the professor to adopt them for class. Currently, the books are only available in PDF format, and there is no print on demand option. The lack of a print on demand option is a drawback, but students can use services like Lulu to print out bound copies of the book. Students can also choose to use the PDF version of the textbook for free.

Global Text Project Copyright

Global Text Project works are published under the Creative Commons Attribute license: the same license Connexions uses. Please see the Connexions section for a brief description of the license.

Textbook Media

A final model worth briefly describing is Textbook Media, which has received less media attention than the four open textbook platforms previously discussed. Textbook Media operates using an advertising model, licensing textbooks and study aids from college publishers. Those textbooks are then offered in four formats with varying pricing models. Like with Flat World Knowledge, students can choose which version of the textbook to use based on personal preference and price.

The key difference between Textbook Media and Flat World Knowledge is Textbook Media's use of advertising. The free, electronic version of the book includes advertising. Before the user views a chapter, she must watch a 30 second ad. The advertisement is not particularly invasive and does not significantly detract from the user experience. If students do not want to use the free, advertising based version, they can pay for three different versions that do not have advertising: an online book, a PDF, or a paperback version. The prices of all three versions are reasonable, ranging from around \$9.95 for the electronic version without advertisements to around \$39.95 for the paperback version.

Textbook Media has more in common with FWK than Connexions or Wikibooks. Like FWK, all the textbooks provided by Textbook Media are in complete form, and they are fully edited. Also like FWK, this is not an open platform. Authors cannot choose to submit books to Textbook Media; rather, Textbook Media targets authors and publishes their material.

Textbook Media's advertising model may provide a model for future open platforms. The current catalog is impressive, particularly in the field of economics. But one major problem with the platform is that the interface for the free, electronic book is not very usable. The interface makes it difficult to imagine many students using the electronic version for any length of time. The interface is aesthetically appealing, but reading the book online is frustrating. Nonetheless, the other options are all reasonably priced, making this a possible option for professors interested in assigning open textbooks.

This paper briefly described Textbook Media because the advertising model, whether it works or not, is an interesting attempt to monetize free content. Open textbook advocates will be well served to remember that there are open textbook models other than Connexions' nonprofit, externally funded model and FWKs 'premium content' business model.

Copyright

Textbook Media publishes its materials under traditional copyright law (personal communication with Ed Laube, 4/2/2009). Traditional copyright law restricts distribution without permission from the copyright holder and limits the way the work can be reused. Educators and students could also possibly run into fair use issues when using Textbook Media. Work published under traditional copyright will likely not play much of a role in the future of the open textbook movement. Open textbooks need to be flexible and dynamic, and few things are less flexible or dynamic than United States copyright law.

Overview

The open textbook movement still must grow before it truly makes a dent in the textbook market, but the movement is viable and will continue to gain prominence. This paper has

highlighted a few open textbook platforms that can be useful for educators, arguing that the movement is not monolithic and different platforms can best be appropriated in different ways. The table below compares the platforms across dimensions. Educators and students should remember that not all open textbooks are the same, and each can be used to match different needs.

	Wikibooks	Connexions	Flat World Knowledge	Global Text Project	Textbook Media
Modular?	No	Yes	No	No	No
Open Contribution?	Yes	Yes with registration	No	No (can volunteer to edit books in development)	No
Funding?	Donation	Grants/Donation	Venture capital/ Premium content	Donations	Advertising
Copyright?	GNU license	Creative Commons	Creative Commons	Creative Commons	Traditional copyright
Quality control?	Community	Lens system/community	Editorial control	Editorial control (volunteer)	Editorial control
Print on demand?	Occasionally	Yes	Yes	No	Yes
Can you edit the text?	Yes	Yes	Yes (beginning in June 2009)	No	No

A few of the dimensions above make certain platforms more usable than others. For example, open textbook platforms should license content under a Creative Commons or GNU license so that people can remix and reuse the content, and Textbook Media does not. Also, open textbooks should be able to be printed on demand to help students who prefer to own a print copy of the textbook. Professors interested in adopting open textbooks will have to weigh the different dimensions in this table and choose the best available option. Different professors want different

things from their textbooks. Some want flexibility to shape a class however they want; some want to teach from a complete, quality controlled textbook. This paper has made recommendations about the strengths of each platform and how professors can best adopt texts from each platform. Below those recommendations are briefly restated:

- **Wikibooks** is a completely collaborative textbook development platform and uses the same interface as Wikipedia. The platform has problems with authorial attribution and quality control but is a valuable tool for a constructivist classroom. Students can do outside research and learn class material by developing class textbooks.
- **Connexions** is a platform/repository solely devoted to the development of open textbook materials. Connexions uses an open contribution model in which any registered user can contribute content. All content is in modular format, leading to increased flexibility. Professors who are interested in developing their own textbooks from existing material should try to use Connexions. The modular format will result in more up-front work because professors have to compile content, but professors will also have greater flexibility.
- **Flat World Knowledge (FWK)** takes a business approach to open textbooks. It targets authors, signs them to contracts, and then edits their textbooks and releases them in final form. FWK does not have the flexibility of Connexions but that makes it easier for professors to adopt an FWK textbook because they are in complete form and there is editorial control. FWK does not currently have many available textbooks, but the amount of content will continue to grow. It is a valuable resource for professors who are not interested in compiling their own textbooks.

- **The Global Text Project** was developed by the University of Georgia and the University of Denver with the goal of providing 1,000 open textbooks to developing world students. Some of the textbooks provided by the Global Text Project will be useful for higher education courses in the U.S. The Global Text Project also provides professors and interested students with a way to contribute to the open textbook movement. Professors can donate out of print textbooks, which will then be digitized and provided for free. Professors and students can also volunteer to edit books currently in development.
- **Textbook Media** takes a different business approach from FWK. It uses advertising to monetize the free versions of its textbooks. Advertising-free versions are available for a reasonable price. All textbooks are licensed from publishers and provided in final form with editorial quality control. Textbook Media's advertising approach is an interesting attempt to monetize open textbooks features some textbooks that could be valuable for professors and students; however, the interface of its free electronic version is difficult to use and all work is published under traditional copyright. Traditional copyright law severely restricts how open textbooks can be used, and the vast majority of open textbooks going forward will be published under GNU or Creative Commons licenses.

Conclusion

The open textbook movement has grown quickly in the last decade and shows no sign of slowing down. The prices of textbooks have continued to increase even with the move to electronic textbooks, and as long as textbook cost remains too high for a significant number of students, interest in open textbooks will continue to grow. This paper has examined the current state of the open textbook movement, focusing on five open textbook platforms. The

examination has not been comprehensive though, and there are numerous open textbook options that have not been addressed in this paper. Going forward, some of these platforms might become more prominent and some might fail. Also, new platforms will arise that provide new options for publishing open textbooks. The future is uncertain, but there is little doubt that the number of open textbooks will continue to increase.

While this paper has examined a few sources that provide open textbooks, it is important to stress that the movement is not yet where it needs to be. Some professors will be able to use the resources outlined above, and some will not. Certain disciplines, particularly business, have more open textbook resources available than others. Professors teaching more obscure courses will likely have to rely on textbooks published by traditional publishers. In the future, more high quality materials will be available for professors teaching in various disciplines. FWK's catalog hopefully represents an overall increase in open textbook materials. FWK currently only has six textbooks available, but by February, 2010, there will be over 25 textbooks available on the site. Connexions also continues to grow quickly and currently has over 9,000 available modules. These growing resources are important to highlight to remind reader that this paper is not an environmental scan of a static environment. During the research for this article countless Wikibooks were begun, over 500 new modules were deposited in Connexions, and three new books were published on FWK. As material continues to be developed, a few exemplar textbooks will hopefully show the viability of the movement and spur adoption and use. We can hope that the future of the textbook industry will be one of traditional textbooks competing with open options. Both professors and students will benefit from that competition.

References

- Anderson, N. (2008). Flat World Knowledge: An open-source textbook revolution? *Ars Technica*. Retrieved April 7, 2009 from <http://arstechnica.com/old/content/2008/09/flat-world-knowledge.ars>.
- Baraniuk, R. (2009). Goodbye, textbooks; hello, open-source learning. Speech given 23 February 2006. Retrieved April 7, 2009 from http://www.ted.com/index.php/talks/richard_baraniuk_on_open_source_learning.html
- Books| The Global Text Project (N.D.) *The Global Text Project*. Retrieved April 6, 2009 from <http://globaltext.terry.uga.edu/books>,
- Borgman, C. (2007) *Scholarship in a digital age*. Cambridge, MA: MIT Press.
- Borgman, C. (2008). Data, disciplines, and scholarly publishing. *Learned Publishing*, 21 (1): 29-38.
- Connexions-Lenses (n.d.). *Connexions*. Retrieved April 7, 2009 from http://cnx.org/help/lens_what.
- Cragun, R. (2007). The future of textbooks? *Electronic Journal of Sociology*. Retrieved April 7, 2009 from http://www.sociology.org/content/2007/cragun_futureoftextbooks.pdf.
- Creative Commons Attribution 3.0 (n.d.). *CreativeCommons.org*. Retrieved April 7, 2009 from <http://creativecommons.org/licenses/by/3.0/>.
- De Pedro, X., Rieradevall, M., López, P., Sant, D., Piñol, J., Núñez, L., et al. (2006). Writing documents collaboratively in Higher education (I): Qualitative results from a 2-year project study. Congreso Internacional de Docencia Universitaria e Innovación (International Congress of University Teaching and Innovation), Barcelona: July 5-7.

- Retrieved April 7, 2009 from http://uniwiki.ourproject.org/tiki-download_wiki_attachment.php?attId=98&page=Uniwiki-Congressos
- Fairchild, M. (2004). Ripoff 101: How the current practices of the textbook industry drive up the cost of college textbooks. *Calpirg*. Retrieved April 14, 2009 from http://www.uspirg.org/uploads/_H/rF/_HrFuXAYUQ-KUSZ8Y80bAQ/ripoff2005.pdf.
- FAQ| The Global Text Project (N.D.) *The Global Text Project*. Retrieved April 6, 2009 from http://globaltext.terry.uga.edu/news_faqs?q=node/14.
- Frydenberg, J. & Matkin, G. (2007). Open textbooks: Why? What? How? When?. *William and Flora Hewlett Foundation*. Retrieve April 14, 2009 from http://www.uensd.org/NUTN2008/program/Sessions/materials/OpenCouseware_paper.pdf.
- Kotke, M. (2008) Flat World Knowledge Working Paper 2. *WisconsInnovation*. Retrieved April 7, 2009 from <http://wisconsinnovation.blogspot.com/2009/01/flat-world-knowledge.html>.
- Marlowe, B., & Page, M. (2005). *Creating and sustaining the constructivist classroom* (2nd ed.). New York: Corwin Press.
- Monge, S., Ovelar, R., & Azpeitia, I. (2008). Repository 2.0: Social dynamics to support community building in learning object repositories. *Interdisciplinary Journal of E-Learning and Learning Objects*, 4.
- Park, J. (2009). \$8 million investment in Flat World Knowledge. *CreativeCommons.org*. Retrieved April 7, 2009 from <http://creativecommons.org/weblog/entry/13677>.
- Parker, K. & Chao, J. (2007). Wiki as teaching tool. *Interdisciplinary Journal of Knowledge and Learning Objects*, 3.
- Ravid, G., Kalman, Y., & Rafaeli, S. (2008). Wikibooks in higher education: Empowerment through online distributed collaboration. *Computers in Human Behavior*, 24: 1913-1928.

Vernon, R. (2006). Paper or pixels? An inquiry into how students adapt to online textbooks.

Journal of Social Work Education, 42(2), 417-427

Wikipedia: List of Wikipedians by Number of Edits (2009). *Wikipedia.org*. Retrieved April 7,

2009 from

http://en.wikipedia.org/wiki/Wikipedia:List_of_Wikipedians_by_number_of_edits.

Zomer, S. (2007). Exposing the textbook industry: How publishers' pricing tactics drive up the

cost of college textbooks. *Student PIRGs*. Retrieve April 14, 2009 from

http://www.maketextbooksaffordable.org/Exposing_the_Textbook_Industry.pdf

Open Textbook Resources and Links

California Open Source Textbook Project (COSTP)

(<http://www.opensourcetext.org/index.htm>)

COSTP is a collaborative undertaking designed to address California's textbook crisis. Focused on developing resources for K-12 students, COSTP is a long term plan designed to eventually provide high quality textbooks while eliminating the \$400 million California pays for K-12 textbooks every year.

Connexions (<http://cnx.org/>)

Connexions is Rice University's open textbook platform. It is one of the leaders in the open textbook movement.

Flat World Knowledge (<http://www.flatworldknowledge.com/>)

Flat World Knowledge has received a great deal of media attention for its innovative approach to open textbook publishing.

Free High School Science Textbooks (FHSST) (<http://www.fhsst.org/>)

FHSST is a project that provides free science textbooks for South African students in grades 10-12. It features textbooks in Physics, Chemistry, and Mathematics.

Global Text Project (<http://globaltext.terry.uga.edu/>)

A smaller open textbooks project funded by the Jacobs Foundation. The Global Text Project began at the University of Georgia and has a relatively large inventory of open textbooks available, and more are currently under development. All work is published under the Creative Commons Attribution license. Contact rwatson@terry.uga.edu or dmccubbr@du.edu if you are interested in contributing to the project.

Open Textbook Registry (<http://www.opentextbook.org/>)

The Open Textbook Registry lets users search through a registry of open textbooks. It does not catalog all open textbooks, but it is a valuable resource for finding material that would likely be difficult to find otherwise.

PBwiki (<http://pbwiki.com/academic.wiki>)

For professors interested in incorporating wiki technology in a constructivist classroom, PBwiki is a good place to start. PBwiki provides free wikis that are easy to use.

Textbook Media (<http://www.textbookmedia.com/>)

Textbook Media takes an advertising based approach to publishing open textbooks.

Wikibooks (http://en.wikibooks.org/wiki/Wikibooks_portal)

Following the same model as Wikipedia, Wikibooks allows users to collaborate on creating completely open, book length projects.