

Digital Textbooks: Emerging Trends & Practices

BLC Fellows Lecture, May 2, 2014

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Prefatory Remarks

When I first conceived of this project over a year ago, my original plan was to create a digital textbook for beginning German learners. What most encouraged me, at the time, were the growing number of resources that were becoming available for authoring digital textbooks, along with the massive amount of copyright-free materials already available online. Then, in January 2013, right when I was writing up my project proposal, a series of articles about digital textbooks came out in the *Chronicle of Higher Education*, and forced me to re-think my plan entirely. What these articles pointed out was that the most ardent proponents of digital textbooks are not necessarily the grassroots, open-source activists we may imagine them to be, but rather the very representatives of the mainstream textbook industry we usually tend to villainize. Around the time, what were once called “textbook companies” were starting to re-brand themselves as “learning companies,” and some of the commentators on the articles in the *Chronicle* were voicing their concerns about the implications of these changes for the academy. Namely, if digital technologies make it possible, not only to *evaluate* student performance through automated grading, but even to *create, organize, and deliver* the contents of entire courses, then we seriously need to re-think our traditional role as classroom instructors—at the very least, beyond the functions of organizing and delivering course content to students and evaluating their degree of success in learning that material. Though by no means a technophobe, I started to wonder whether we really need digital textbooks, or whether we’ve just come down with “Everest Syndrome,” a term coined by Cleborne Maddux, Professor of Education at the University of Nevada, to describe how many teachers feel a need to use technology in their classrooms simply because it exists—just like the mountaineer George Mallory, when asked why he wanted to climb Mount Everest, answered simply, “Because it’s there!”

I’m extremely grateful for having had the opportunity to pursue my questions and concerns about digital textbooks on a weekly basis at the BLC colloquium, and I’d like to thank all of the

participants for their feedback. Let me take a moment to thank you, as well, for coming out and hearing about our projects. My presentation today will cover what I believe to be the most significant trends currently emerging around digital textbooks. As my project developed, I also became interested in researching the longer history of the textbook, especially in terms of comparing the hype about digital textbooks today with older reflections on media competition among classroom technology, from the introduction of sound and moving images in modernity through the development of the printing press all the way back to Plato's reflections on the change from oral to written culture. For today, I'll spare you the Plato, though if you're interested, I do plan to publish an article about some of these topics that should help provide historical perspective on our current debates about the future of textbooks, as well as indicating some astonishing roads not taken within their history.

In my paper today, I'll introduce four main trends emerging around digital textbooks for teaching and learning languages, which you'll find outlined on your handout. I've also selected some secondary sources in case you'd like to explore some of the excellent scholarship on digital textbooks. One word of warning: as some of you have probably already noticed, I like to use the images on the screen as a counterpoint to my script, and not only as an illustration of it, so you'd probably do best to put the handouts aside until after the presentation. I'm also going to commit the cardinal sin of talking over videos during my presentation without stopping to analyze them. If you'd like a copy of the slides, you can always e-mail me. Ultimately, my aim in discussing these four categories of emerging trends is to make some larger points about how we might change our dominant mode of thinking about digital textbooks, especially in terms of the problematic assumption that a shift from print textbooks to digital textbooks would constitute some revolutionary moment that would forever alter the course of the academy. With that in mind, then, please consider the following revolutionary scenario, set in a not too distant future.

Introduction: The Future of Digital Textbooks

This year, you decide one day, will finally be the year you embrace digital textbooks, and require students to use them in your beginning language class. Though you're not all that tech savvy, you're excited about the potential of the new technology to motivate your students, reduce their astronomical textbook costs, and, hopefully, improve their learning outcomes—not to mention the obvious accessibility improvements for students with vision and hearing

impairments. Whenever any of your students are reading or writing, they can easily switch between different scripts like Katakana, Hiragana, and Kanji, and they can learn all the variants in Bosnian, Serbian, and Croatian through layered displays. Perhaps best of all, you think in secret, “Thanks to direct downloads, now none of them will have an excuse for not bringing their books on the first day of class!” As it turns out, some of them have difficulty installing the software; others realize that their hardware is already out of date; and even more experience crashes while using the textbook that apparently delete all of their progress. You’re surprised, moreover, at the various ways your students have found to access the digital textbook—on computers, tablets, and phones, of course, but even in the form of on demand print outs. What’s even more surprising, however, is that most of your students wound up renting their digital textbooks for the length of the semester, and that their savings were not actually that great compared to the prices for renting print textbooks.

Still, you’re confident that all of these bugs will get ironed out eventually. As the motto of the digital textbook company has it, “The more you use it, the better it gets.” And it really does—in a sense. As soon as the students complete an introductory survey in the textbook, you have an immediate sense of their interests and their motivation for taking the class. Plus, the textbook continuously adapts to student input and tailors the content of the course, not only to their current knowledge of the material, but to every aspect of their lifestyles and personal situations... So the vegetarians in your class will never be asked to learn the German words for fifty different varieties of meat, and French learners with non-traditional families can avoid the embarrassing divisions between a chapter on “*La famille*” and another on “*Des familles bien diverses*,” or “really diverse families.”

It takes some time for you to remember not to say, “Open your textbooks to page...” But, as time goes by, you quickly become amazed at the amount of information the textbook provides you with about your students’ lives, as well as their study habits. Now, you finally know exactly which passages they found interesting in the readings, which grammar concepts were most confusing for them, which online resources they actually ended up using, and even how much time they spent on their homework the previous night. Even though having all of that data right at your fingertips kind of weirds you out, you remind your students about the transparency of the system—that they have access to the exact same data, which they should be using to track

their progress and to improve their study habits—and you reassure them that data about textbook usage will never count as part of their final grades.

At times you find yourselves wondering, “Will a digital textbook replace me?” But you remain confident that you can adapt to this brave new world, even if your new role in the classroom seems to have been reduced *from* that of reciting from a script and providing authoritative knowledge or oral input *to* that of curating content, providing tech support, and helping students cope with their increasing information overload...

As you might imagine, I could go on like this for the remainder of my presentation, spinning out one ideal feature after another, and imagining how some of the ones that are usually marketed as the most emancipatory, such as the price and accessibility of digital textbooks, can easily turn out to be the most *dystopian*, whereas other features that we might initially be more hesitant about, such as customization and data surveillance, might actually turn out to be the most *utopian*, provided that we take the time to reflect on how we use them. Even if my hypothetical scenario may have sounded like science fiction, you can rest assured that all of what I described is already being done in digital textbooks, or in other technologies for teaching and learning, though there is yet to be one single digital textbook that contains all of these features.

In short, all of the components of what could be the perfect digital textbook already exist, just not in one place, and not always in the form of a textbook. Hence, my main research questions have come to focus on the unity and stability of the textbook form in a digital age. Will digital textbooks continue to acquire additional features with the aim of creating some sort of Textbook 2.0? Or, will the textbook as we know it dissolve into a larger ecology of digital materials for teaching and learning? Likewise, reversing the equation of the textbook form and digital technology, to what extent will the medium of the book continue to serve as a stable metaphor for emerging digital trends, ranging from designations like “flexbooks,” “courseware,” and “personalized learning experiences” to even more pervasive print metaphors like page numbers, chapters, and supplementary materials?

1. From Multimedia Textbook Supplements to Integrated Multimodal Learning

If the first generation of digital textbooks was primarily concerned with problems of multimedia, such as the question of whether to use embedded content or links to online

resources, the second generation of digital textbooks is starting to tackle a host of different problems, which I'll get to shortly. As for multimedia, let me only remind you that teaching and learning materials have long been multimodal—only the focus was primarily on words, images, and, most recently, sounds and videos. Recently, however, the traditional distinction between core *textbook content* (words and images) and additional *textbook supplements* (audio and video) has become increasingly problematic, thanks primarily to the function of the computer as a single media system capable of storage, processing, and distribution. As a result, the textbook industry has been forced to regroup. Today, instead of audio CDs, transparency slides, and activities workbooks, textbook companies market so-called “enhanced textbooks,” while also selling access codes to “premium resources,” stored in password-protected repositories. In my analysis, enhanced textbooks and premium access codes are both just renewed attempts to perpetuate the distinction between core materials and necessary supplements—all in order to generate additional revenues.

Given my misgivings about the economics of the textbook market, let me mention only one of the most interesting cases to appear recently in multimodal textbook design. Kno (spelled K-N-O) was a short-lived digital textbook company, founded in May 2009 and acquired by Intel in November 2013 for around 15 million dollars. Initially, the company wanted to create a tablet device for university students that would contain all of their various textbooks. Quickly, however, they seem to have recognized the difficulty of reinventing the wheel, and rather than encouraging the further development of textbooks in a native digital format, they started to focus on developing a means of turning extant print textbooks into digital editions. The automated workflow they developed for producing digital textbooks, called Kno Ingest, extracts information from a PDF file and converts it into flowable text. Images are also flagged so that they can be replaced with videos; and end-of-chapter activities get marked up with code that allows them to be integrated into online assessment and grading tools. What this automated workflow ultimately indicates, in my analysis, is one possibility for bridging the perceived divide between what we call “print textbooks” and what we call “digital textbooks.” Remember, moreover, that every print textbook currently on the market is already subject to a digital publishing process—the content remains the same across platforms, and all that differs is the end product and the interface that reaches the user.

2. Content Aggregation, Course Material Repositories, Open Educational Resources

We are currently witnessing a change not only in the meaning of textbook *content*, as is evident in Kno's automated workflow, but also in the meaning of textbook *production*, *distribution*, and *ownership*. These changes are exemplified by the current push for "open educational resources," which are essentially a combination of "open-access movements" (for opening up content from copyright restrictions) and "open-source movements" (for opening up the source code in programs to easy modifications). Some proponents of open educational resources, such as those at the Center for Open Educational Resources & Language Learning at UT Austin, have argued that the possibilities of open-educational publishing will ultimately empower users who have traditionally been shut out of the loop by the textbook publishing industry—transforming students and classroom instructors from consumers of wholesale educational packages into producers of collaborative educational materials. Putting aside the question of whether students and instructors are really such mindless consumers of educational materials (I certainly don't think so...), I would emphasize the point that any project aimed at developing a repository of educational resources raises more urgent questions about adaptability, portability, and obsolescence.

Even if open educational resources don't turn out to be as emancipatory as some may think, they definitely represent a significant change in the history of instructor-developed materials. Traditionally, instructor-developed materials tended to break down into two main categories: *Textbooks*, designed with hardcovers and glossy pages so that they would last longer, were supposed to provide the "disciplinary canon" for both teachers and learners, and then sit on their shelves as reference works in the future. *Additional Materials*, like handouts, photocopies, and slides, were supposed to help fill in the gaps or to update outdated content, but they were designed for specific context-dependent situations and rarely for some universal audience or for posterity. Databases of educational resources represent a departure from both of these trends, insofar as they place more emphasis on organizing the vast amount of materials that are already available, rather than creating them from scratch. Hence, databases of educational resources require instructors to think more frequently about questions of evaluating available materials; developing learning strategies; and establishing learning objectives. Furthermore, if instructors can no longer follow a script provided by a textbook author, then teacher training will need to focus more on preparing teachers for handling their new role as something like curators—

evaluating, selecting, and creating diverse combinations out of available materials, while also figuring out how to involve students at various stages of this process. Ultimately, if instruction becomes more a matter of curating content than creating it or reciting it from a script, then instructors, like curators, will need to focus on finding the most effective ways to establish context.

There has been at least one unintended consequence of open educational resources, evident in a recent lawsuit against the Boundless textbook company. For the past three years, they have been offering what they call “textbook alternatives,” free-of-charge. In addition, they offer premium editions, for \$19.99 each, which are actually aggregations of materials drawn from open source repositories, which are then “aligned” to popular print textbooks. Predictably, the company was sued by three of the largest textbook publishers in March 2012 for copyright violation. What I find interesting here is that the textbook publishers’ claim was not only that Boundless copied their original *content* but even more significantly that it copied an original *form*—the textbook, perhaps the most unoriginal form imaginable. I quote from the legal proceedings: “Boundless textbooks copy the distinctive selection, arrangement, and presentation of Plaintiffs’ textbooks.” As a result of the terms of their settlement in December 2013, we know only that Boundless survived, even if the company is no longer allowed to present its products as “textbook alternatives,” competing directly with those of the textbook giants. Surprisingly, however, their ingenious method of aggregating content seems to have escaped unscathed. As the company’s most recent motto has it, “Boundless goes way beyond your assigned textbook,” a jab not only at classroom instructors for assigning inadequate learning materials but also at the textbook industry for creating them. All of this has massive implications for the epistemology of textbooks. Traditionally, textbook authors were the ones who defined their field and established the canon of topics, which is why the point about the scope and sequence of materials was so important in the Boundless lawsuit. Due to developments in open educational resources, however, instructors are now able to reconfigure the traditional canon of knowledge in their field with the unintended consequence that a company like Boundless can just as easily monetize the process.

3. Textbook Analytics and the Quantified Student

What I'm suggesting here is that learning how to process and filter information are becoming even more important skills than creating it... I'm sure you've already heard the statistics about "big data:" nearly a decade ago, the size of the Internet was estimated to be around 5 million terabytes, and, every day, it continues to expand at an exponential rate. As the authors of *The Human Face of Big Data* put it, "Today, in the first day of a baby's life, the world creates 70 times the data contained in the entire Library of Congress." These trends are continuing to make their way into the academy in all kinds of unimaginable ways.

A great example of how reading data and predictive analytics are becoming part of the language classroom can be found in CourseSmart, the company that provides learning analytics on over 90% of the core textbooks currently in use in American higher education. A joint venture of the world's five largest textbook companies, CourseSmart collects data for each student and for class averages about what it refers to as a user's "engagement" with course materials, such as their average session length, the average number of pages viewed, and the average number of highlights, notes, and bookmarks. This data is made available not only to students and instructors but also to faculty, provosts, deans, course designers, and, not surprisingly, the textbook companies themselves. In other words, even if you, as an instructor using one of these textbooks, choose to "opt-out" of data collection for the purposes of your own class, the data will still be available to a variety of other parties. As if that weren't frustrating enough, CourseSmart claims that it can predict student course outcomes by feeding this data into a proprietary algorithm, known as the "CourseSmart Engagement Index." From the perspective of pedagogy, the obvious problem here is that we know that expectations drive performance, the so-called "Pygmalion" or "Rosenthal effect," and when teachers expect that some students will do well and others will do poorly, their expectations often turn out to be proven true.

It is essential here to emphasize the distinction between these kinds of *learning analytics*, which tend to focus on developing learning management systems (like the one that will replace bSpace this summer), and a different kind of *educational data mining*, which focuses more on developing intelligent tutoring systems. To illustrate a more encouraging trend in this context, let me describe how computer-based algorithms and feedback loops are currently being used in the context of vocabulary acquisition. Spaced-Repetition Software, or SRS for short, uses an algorithm to present vocabulary items in increasing intervals of time based on how well you

remember them. Many of your students are probably already familiar with the technique, though probably not the name, from a wide variety of flashcard programs, such as Anki, Course Hero, Memrise, Duolingo, and countless others. Designed primarily to improve long-term recall, these programs do not merely display a flashcard, but additionally prompt the user to input their knowledge of the vocabulary item. If you don't know an item at all, you will see it again in a short amount of time, whereas you will only be given items you know well at spaced intervals over longer periods of time. As many of you will recall, this apparently digital magic can be traced back to Sebastian Leitner's system of flashcard memorization developed in the 1970s, and Paul Pimsleur's method of "graduated-interval recall" developed around the same time, both of which rely, in turn, on Hermann Ebbinghaus's description of the "learning curve"—or, more accurately, the "forgetting curve"—in the late nineteenth century. Comparing these various cases further would highlight a key difference in the use of analog and digital technology for the development of intelligent tutoring systems: digital technology allows data to be collected and processed simultaneously, meaning that evaluation gets seamlessly integrated into the learning process—turning computers into tutors and language learners into the monitors of their own progress.

4. Programmed Instruction, Adaptive Learning, Intelligent Tutoring Systems

In my view, all the current talk of adaptive learning signals the triumphant return of "programmed instruction," or, the attempt to design intelligent tutoring systems that adapt to learner input and carry out a sequence of commands based around a learning objective. Take, for example, McGraw Hill's SmartBook, an e-textbook with diagnostic statistics and adaptive learning technology that forms part of their LearnSmart Advantage Suite. The SmartBook presents textbook content in four different stages: Preview, Read, Practice, and (the unfortunately named) Recharge. Using the same spaced repetition technique I just mentioned, the SmartBook prompts users to evaluate how well they know material during the practice stage. It then "adapts" to the user's response, meaning that it highlights content based on what the student does not know, while also taking into account what the textbook author has deemed to be high-priority learning objectives. Since its launch in 2009, LearnSmart claims to have 3 million total users who have answered over 2 billion unique questions in textbooks, though in the context of foreign language learning, SmartBooks are currently available only for French, Spanish, and

Italian. While this kind of adaptive learning technology might help with well-known pedagogical phenomena like “backsliding,” it ultimately remains a form of programmed instruction, only with more bells and whistles.

To my mind, a more interesting case of programmed instruction can be found in a project called Smart TXTBKS that is currently being developed in the Philippines. Although the name of this project deliberately evokes the kind of textbooks designed for “smartphones,” Smart TXTBKS are actually a delivery system for “dumb phones,” or “feature phones.” The project uses surplus cell phones and SIM cards, which are re-programmed to contain condensed versions of elementary school textbooks delivered via text messages, in effect, transforming a cell phone into an e-reader. Textbook content, currently often for subjects like English as a Second Language, can then be delivered to students in the form of 160-character text messages. Sadly, delivering content in this format means having to cut all the multimedia components out of the digital textbook, though I still consider the project significant for drawing attention to the possibilities of creating low-cost alternatives to expensive gadgets, and for salvaging and re-purposing what are normally perceived to be obsolete devices, especially significant as technological waste increasingly gets dumped from Silicon Valley onto developing countries. Lastly, I would point out that the students in promotional materials for Smart TXTBKS still use pen and paper in addition to their phones, again reminding us that digital technology can still play nice with analog technology in the classroom.

Conclusion: Digital Textbooks and Media Change

In conclusion, I'd like to remind you that the main rhetorical strategy in the current debates about digital textbooks tends to be polarizing the issue into a pair of binary alternatives, “for digital textbooks” or “against them,” thereby creating pressure to take a side and make a choice. If only we could weigh up the pros and cons of digital textbooks, these debates seem to suggest, then every student, parent, and educator would be able to make an informed decision! Admittedly, I have not tried to make this decision any easier for you in my presentation today. Instead, I hope to have contributed to your thinking about the question of digital textbook adoption as more than just a matter of consumer choice or inevitable technological progress.

My main point of contention has been with the widespread insistence on asking whether digital textbooks *should* replace print textbooks, a question based on the larger assumption that

digital textbooks *will* replace print textbooks. Any student of Media Studies would instantly recognize this statement as a form of “technological determinism,” the problematic claim that new technologies inevitably replace older ones within a brief span of time, consequently having a revolutionary impact on society. From more recent scholarship in Media Studies, we know that any change from one medium to another is always a more gradual and complex process, a mixture of tradition and innovation, more evolution than revolution. If we stop viewing digital textbooks as a replacement for print textbooks or as their competitor in some sort of zero-sum game, then we have a better chance of imagining possible futures in which print textbooks and digital textbooks continue to co-exist or in which all of these various offerings simply continue to raise questions about our use of any teaching and learning material in the foreign language classroom.

Ultimately, if computers seem increasingly more human, and humans increasingly more like computers, then we should find other ways of thinking about the relation between technology and the foreign language instructor. Rather than simply insisting on the difference between the two as another way of denying the possibility that a digital textbook might someday replace us, we could concede that computers make more efficient language tutors and move on to examine questions about the role of a language teacher beyond that of a tutor or as a coach, about the possibilities of blended learning and the need for digital literacy, and, as always, about the purpose of using any material for teaching and learning in the foreign language classroom.