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State Initiatives Regarding Electronic or Open Source Textbooks

By Noe M. Cisneros

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A growing number of states are using legislation as a means of enabling the use of electronic or open source textbooks. For example: Arizona, Iowa and Tennessee expanded their definitions of textbooks to include digital content; Virginia has its first open source textbook posted for public review; West Virginia took it a step further and required textbook publishers to provide an interactive version; and Texas and California both have digital textbooks available to their public school students as well as pilot projects in place to test the effectiveness of technology on learning. On September 1, 2009, the National Association of State Boards of Education announced a $75,000 grant from the William and Flora Hewlett Foundation to revise instructional materials policies to better accommodate open educational resources.[1]

At the postsecondary level, the emphasis in states has been on controlling costs of textbooks — at both four-year and two-year institutions.

What are digital textbooks?

Digital textbooks are electronically accessed resources. The two primary types of digital textbooks are **e-textbooks** and **open source textbooks**. Digital textbooks might be purchased from a traditional textbook publisher as "e-textbooks," or they might have been authored as "open source." Open source can refer to materials developed collaboratively or by a single author, but they are made available for free. The hard copy textbooks most of us grew up with are referred to as **traditional textbooks**.

Recent Efforts in Texas and California

Texas

In 2009, the Texas legislature enacted H.B. 4294. This new law allows the Commissioner of Education to adopt a list of "electronic textbooks" and instructional materials, including tools, models and investigative materials for K-5. Prior to being put on the adoption list, the electronic textbooks must be:

1. Commented on by the state board of education
2. Reviewed and recommended by a panel of experts in the subject area of electronic textbooks or the instructional material and experts in educational technology
3. Satisfy the following criteria:
   a. Meet the National Instructional Materials Accessibility Standard to practical extent
   b. Align with current research in subject
   c. Include coverage of essential knowledge and skills used by the state
   d. Include appropriate training for teachers.

It also allows money allotted for textbooks to be used in the purchase of equipment necessary to support the use of approved "electronic" textbooks.

Texas H.B. 2488, also enacted in 2009, authorizes "eligible institutions" of higher education or the state to develop open source textbooks for use in the state's classrooms. An eligible institution is defined as:

1. A designated or emerging research university under the higher education coordinating board's accountability system or a private university that is a member of the Association of American Universities or
2. A "public technical institute."

The state board of education must place an open source textbook developed by an "eligible institution" on a usage list if:

1. The textbook is written, compiled or edited primarily by faculty who specialize in the subject area
2. Each contributing author is identified
3. The appropriate department in the institution certifies the textbook for accuracy
4. The institution determines that the textbook qualifies for placement on one of the lists for use based on the state's essential knowledge and skills related to that subject.

The state board of education may develop its own open source textbook by purchasing one or more for each subject through a "competitive process" paid for by state textbook funds. After writers are chosen through the "competitive process" and the book is purchased, the state then has unlimited authority to modify, delete, combine or add content to the textbook.

The following table summarizes the sequence of Texas initiatives.

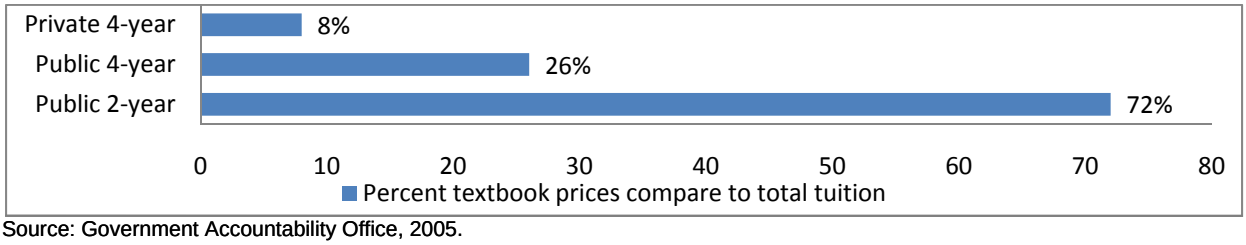
State	Pilot Programs and Initiatives
Texas	**Scope: Secondary level** Required the Texas Education Agency to establish a technology immersion pilot project to provide a wireless mobile computing device to each student in participating schools and implement the use of software, on-line courses and other appropriate learning technologies that have been shown to improve academic achievement. TEX.EDUC CODE ANN. §32.151
	Scope: Postsecondary level Required the Texas Higher Education Board to conduct a study regarding the use and availability of electronic textbooks in higher education in Texas and other states. Requires that the study and its policy recommendations focus on results of the existing University of Texas - Austin pilot and address methods for encouraging the use of electronic textbooks at public or private institutions of higher education in the state. Report due to governor by Dec. 1, 2010. TEX.EDUC CODE ANN. §61.0665 (H.B.4149, 2009)
	Scope: Secondary level Allows for "eligible institutions" to develop or to purchase open source textbooks for use in classrooms. Open source textbooks will be determined as conforming or non-conforming based on whether they have material covering all of the state's essential knowledge and skills or at least 50% of them respectively. TEX.EDUC CODE ANN. §31.0241, TEX.EDUC CODE ANN. §31.071 (H.B.2488, 2009)
	Allows the state textbook fund to be used to purchase instructional materials including electronic textbooks approved by the state commissioner of education. TEX.EDUC CODE ANN. §31.004(f) (H.B.4294, 2009)

California

In 2009, California Governor Arnold Schwarzenegger called on Education Secretary Glen Thomas to make open source textbooks — based on content standards — available for use in high schools by the fall of 2009. The California Learning Resource Network (CLRN) was placed in charge of this task and on August 11, 2009 released its review of the proposed digital textbooks. Ten out of 16 open source textbooks were approved as having met 90% of the high school math and science standards.[2] The complete review is available at the CLRN Web site at www.clrn.org.

Digital Textbooks as a Means of Controlling Costs

In 2005, a study completed by the Government Accountability Office determined that — over the past two decades — the cost of traditional textbooks at the college level has outpaced inflation two to one.[3] The following table shows the percentage of textbooks and supplies as compared to total tuition for a private and public four-year and public two-year institution.

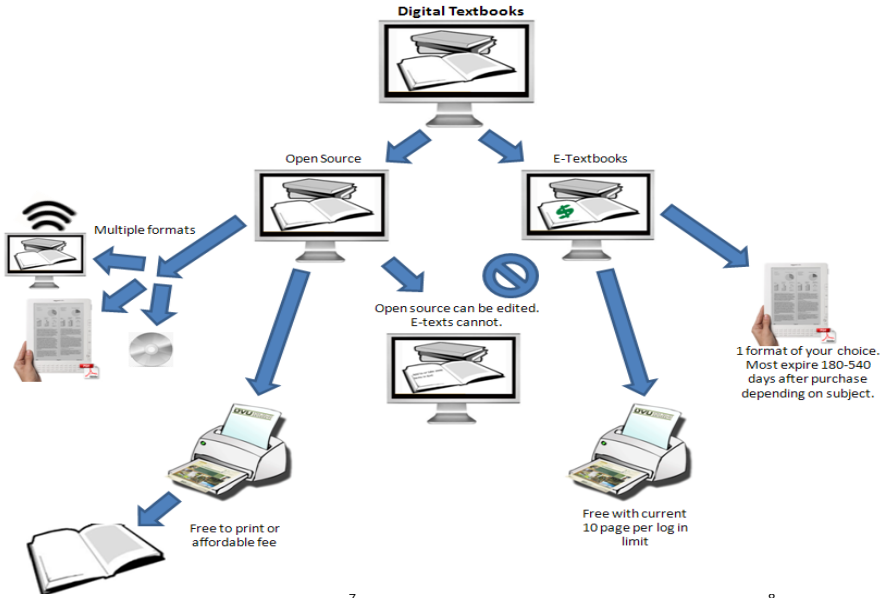


Source: Government Accountability Office, 2005.

A study done in 2007 by the U.S. Department of Education's Advisory Committee on Student Financial Assistance stated that between 2004 and 2007, "34 states proposed a total of 100 bills related to textbook expenses."[4] States such as California, Colorado, Connecticut, Florida, Texas and Washington passed such legislation. For example, Washington requires that information such as titles, authors, editions and prices be disclosed to students at least four weeks before the start of the class for which the materials are required. Faculty and staff members are supposed to consider adopting free, open source textbooks when available, and consider working with college librarians to put together collections of free online web and library resources. In 2004, Connecticut began to require the Commissioner of Higher Education to examine ways to maximize the combined purchasing power of the various units within the state system of higher education and independent institutions of higher education in order to ensure that textbooks are priced and sold at a reasonable cost. In 2009, The University System and University Press of Florida announced a pilot project that will provide a digital version of some of their college textbooks for free.

E-Textbooks vs. Open Source Textbooks

A study authored by the Nicole Allen of the Student Public Interest Research Group highly encourages open source textbooks as a viable low-cost solution because they are affordable, printable and accessible.[5] The following flow chart and table compare features from two well-known open source companies, Flat World Knowledge and Connexions to the most available source of e-textbooks, Course Smart. For a more detailed view of cost comparisons, see the Allen study, *Course Correction: How Digital Textbooks are off Track and How to Set Them Straight*.[6]



Sources: Student Public Interest Research Group, 2008,[7] and Frank Lyman, VP CourseSmart, 2008.[8]

Qualities	Open Source	E-Textbook
Affordability	• All are free to view online. • Some are viewed with ads in the margins to subsidize costs. • Ads can be removed for minimal fee.	Course Smart states on their homepage that current average savings per e-textbook purchased is $62.29. According to the Allen study:[9] • E-textbooks surveyed were "exactly the same" price as new traditional textbooks bought and sold back to book store. • On average, e-textbooks surveyed were twice the cost of a used traditional textbook bought and sold back to bookstore. • On average, e-textbooks surveyed were 39% more than the cost of a used traditional textbook bought and sold back online.
Printability	Some are free to print; others charge minimal fees by the chapter or by the book. For example, open source company Flat World Knowledge charges:[10] • $19.95 to self print • $29.95 for black and white version • $59.95 for color version • $39.95 for audio version.	Course Smart e-textbooks: • May be printed 10 pages at a time from online or downloadable version • Are limited to printing 150% of the pages in book. For example, books containing 200 pages can have 300 pages printed. According to the Allen study: • Printing is limited to approximately 10 pages per log in session not necessarily referring to Course Smart.
Accessibility	• Unlimited access to webpage where open source textbook is hosted • Downloadable in multiple formats such as: Kindle Reading Device(fee), CD, or PDF on computer drive	• Can be viewed either online or downloaded to a single computer or device such as the iPhone, but not both • Generally, the subscription periods last between 180 and 540 days depending on the subject.
Availability	Connexions, a global repository of educational content, currently has 911 collections (open source textbooks) and 14,942 modules (sections of textbooks broken down to allow instructors to modify and move content easily). Modules piece together to form collections.	Course Smart currently has 7,323 titles in 949 course areas across 113 disciplines from 14 major publishers.
Features and benefits	• Word search • Copy and paste options • Paper saving • Shipping cost savings as compared to traditional textbooks • Flash cards (fee) • Ancillary study guides (fee)	• Word search • Copy and paste options • Paper saving • Shipping cost savings as compared to traditional textbooks • Note-taking functions • Highlighting functions • Matched content and page numbers of traditional textbook
***Newest features* becoming available on e-textbooks**	• Auto summarize: identifies key points in text by analyzing frequency of words in text • Online dictionary and thesaurus • Text to speech relays text in digital text to speech • Readability statistics: measures how easily an individual can read text • Change of font type • Change of font size • Background color • Discussion forums • Smartphone access	

Other Related Projects and Initiatives

Examples of Open Textbook Projects:

1. **The California Open Source Textbook Project** is a collaborative public/private undertaking that "aims to employ the advantages of open source content to turn K-12 curriculum and textbook construction into a revenue generator for the state."

2. **Community College Consortium for Open Educational Resources**, supported by the William and Flora Hewlett Foundation, is a joint effort by the Foothill-De Anza Community College District, the League for Innovation in the Community College, and many other college and university partners to "use open educational resources and especially open textbooks in community colleges" — something President Obama has pushed for in his American Graduation Initiative.

3. **Connexions** is a registered trademark of Rice University and is a "Content Commons of free, open-licensed, educational materials in fields such as music, electrical engineering and psychology."

4. **MIT Open Courseware** is a Web-based publication of virtually all MIT course content including lecture notes, exams and videos not necessarily digital textbooks. It is available to everyone even if you are not an MIT student.

5. **The Assayer** considers itself the web's largest catalog of books whose authors have made them available for free. It is considered a good place to find free books for math, science and computers.

6. **Flat World Knowledge** allows instructors to modify books for their own course. They also offer audio books, and a $19.95 self-print option. Their open source authors receive 20% royalties versus the typical 15% for traditional textbooks authors.

7. **Global Text Project** is based out of the University of Georgia to "create open content electronic textbooks"[11] available free from their Web site.

8. **Open Educational Resources (OER) Commons** is an example of how easily open source content can be changed and shared.

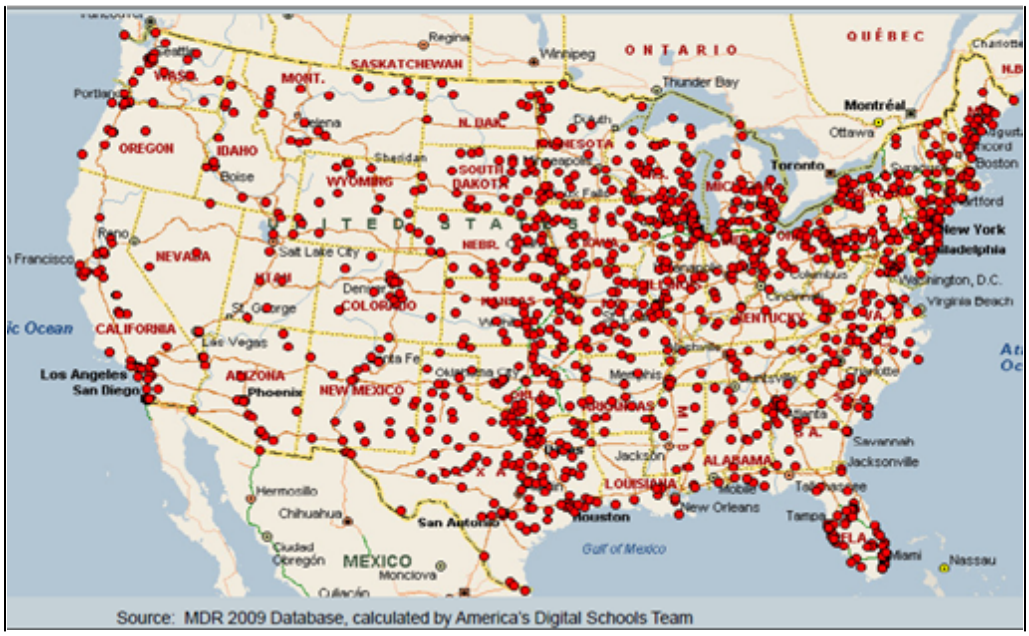
9. **Multimedia Educational Resource for Learning and Online Teaching (MERLOT)** in conjunction with the Student Public Interest Research Group is looking to "increase the number of postsecondary faculty who incorporate open learning materials into their courses…"

10. **The Orange Grove Text Plus** is a pilot project between the University Press of Florida, University System of Florida, Florida Distance Learning Consortium and the Florida College System. Orange Grove Text Plus currently offers 120 textbooks and scholarly monographs free online with more titles added on a continuing basis as well as bound format copies for 40-50% less than similar traditional textbooks.[12]

Student Access

For states considering expanding the use of digital textbooks, it is important to gauge the availability and accessibility of computers. In September 2009, West Virginia's legislature amended the state's textbook adoption process to make it easier to submit digital text-based materials for approval and required that publishers include an interactive version of all print-based text.[13] Computer access is an issue, though, as in 2007 Governor Joe Manchin III noted that only 55% of households have computers.[14] The following map shows a list of schools where 90% of the staff and students have access to computers across the United States.

Ubiquitous Computing: School Locations



Making laptops available to students is one means of improving access to digital textbooks. The following lists laptop initiatives — some with data on their impact on student learning, and some without. Most laptop initiatives that affect learning in a positive way appear to include an "appropriate implementation" plan.

Laptop Initiatives with an Evaluative Component

1. **Maine's Learning Technology Initiative (MLTI)** in 2002 gave laptops to every 7th and 8th grader in all 243 middle schools in the state. The Center for Education Policy, Applied Research, and Evaluation at the University of Southern Maine concluded a study in March 2009 that shows:
    a. Writing scores improved approximately 1/3 of a standard deviation.
    b. Twice as many students who used laptops met state proficiency standards as compared to students who just used laptops as a "finishing" tool.
    c. Economically disadvantaged students outperformed economically advantaged students in some situations.
    d. Overall writing performances improved significantly both on laptops and paper and pencil.[15]

2. **Enhancing Missouri's Instructional Network Teaching Strategies (eMINTS)** provides one computer for every two children while supporting educators as they integrate multimedia technology. The University of Missouri-Columbia's Office of Social and Economic Data Analysis performed analyses of Missouri Assessment Program test results for 2003 and 2004.
    a. 2003 analysis showed significant differences between eMINTS and non eMINTS students on Communication Arts, Math and Social Studies MAP tests.[16]
    b. 2004 analysis suggests that eMINTS enrollment helps reduce the achievement gap between African-American, special education and Title I students as compared to other students.[17]
    c. 2005 analysis African-American eMINTS students did not score significantly higher than African American non-eMINTS students. Non-African-American minority students showed the largest difference in scores posting a 19-point difference with non-eMINTS

students.[18]

3. **Henrico County, Virginia** began a one-to-one laptop initiative in 2001. Eighty percent of district schools were fully state accredited at the start of the program. By spring 2003, every regular school in the district was fully accredited. The district attributes the 100% accreditation to the one-to-one initiative. Unanticipated results were teacher enthusiasm, retention and recruitment and increased parent involvement and technology literacy.[19]

4. **New York City** piloted with the non-profit organization One Laptop per Child to provide 1,500 laptops to New York City public schools. Columbia University's Institute for Learning and Technologies completed a small four-month qualitative study showing the success of the program.[20]

Other Laptop Initiatives (no evaluative component)

1. **Fresno, California,** in fall of 2008, distributed nearly 10,000 Mini-Note PCs from Hewlett-Packard Company (HP) to students in grades 2-12. HP gave the district a volume price discount of $500 per laptop.[21]

2. **South Carolina** created a partnership between the state department of education and the nonprofit Palmetto Project that started a 500-laptop pilot project for kindergarten and elementary students in Marion County, South Carolina.[22]

3. **Birmingham, Alabama** funded a 1,000-laptop pilot program, beginning with Glen Iris Elementary School, which has a student body of 800. It was the precursor to a $3.5 million, 14,000-laptop project that involves the whole city.[23] On July 8, 2008, the Birmingham school board accepted the remaining 14,000 computers.[24]

4. **Illinois** initiated a technology immersion pilot project that provides a wireless laptop computer to each student, teacher and relevant administrator in participating schools and implements the use of software, on-line courses and other appropriate learning technologies. ILL.COMP.STAT.ANN. 5/2-3.135(a)

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[1] Press Release, *The William and Flora Hewlett Foundation Awards Grant to NASBE to Assist States in Brining K-12 Textbook, Instructional Materials Adoption Policies Into the 21st Century*, Berlin, 1 September 2009.
[2] California Learning Resource Network, *Free Digital Textbook Initiative Report* (California: California Department of Education State Board of Education, 2009).
[3] Government Accountability Office, *College Textbooks, Enhanced Offerings Appear to Drive Recent Price Increases*, (United States Government Accountability Office, 2005).
[4] The Advisory Committee on Student Financial Assistance, *Turn the Page, Making College Textbooks More Affordable*, (United States Department of Education, 2007).
[5] Nicole Allen, *Course Correction How Digital Textbooks Are Off Track and How to Set Them Straight*, (2008): 5. http://www.maketextbooksaffordable.org/course_correction.pdf, (accessed August 28, 2009).
[6] Nicole Allen, *Course Correction How Digital Textbooks Are Off Track and How to Set Them Straight*, (2008): http://www.maketextbooksaffordable.org/course_correction.pdf, (accessed August 28, 2009).

[7] Nicole Allen, *Course Correction How Digital Textbooks Are Off Track and How to Set Them Straight*, (2008): 7-15, http://www.maketextbooksaffordable.org/course_correction.pdf, (accessed August 28, 2009).
[8] Gale Holland, "E-textbooks may not be cheaper than printed ones, report says," *Los Angeles Times*, 26 August 2008.
[9] Nicole Allen, *Course Correction How Digital Textbooks Are Off Track and How to Set Them Straight*, (2008): 5, http://www.maketextbooksaffordable.org/course_correction.pdf, (accessed August 28, 2009).
[10] Press Release, *38,000 College Students to Save $3 Million Utilizing Flat World Knowledge Open Source Textbooks in Fall 2009 Semester*, Marketwire, 20 August 2009.
[11] Global Text Home Page, http://globaltext.terry.uga.edu/home, (accessed September 22, 2009).
[12] Orange Grove Texts Plus, "University Press Makes Affordable Textbooks a Reality", (Florida: University Press of Florida, 2009)
[13] W. VA. CODE ST. R. §126-36-5.15
[14] Gov. Joe Manchin III, *Opening Our Rural Communities to 21st Century Opportunities*, West Virginia: Governor's Office, 17 August 2007.
[15] Maine International Center for Digital Learning, Center for Education Policy, Applied Research and Evaluation, *Research and Evaluation of the Maine Learning Technology Initiative Laptop Program*, (Maine: University of Southern Maine, 2009).
[16] Office of Social and Economic Data Analysis, *Analysis of 2003 MAP Results for eMINTS Students*, (Missouri: University of Missouri-Columbia, 2004).
[17] Office of Social and Economic Data Analysis, *Analysis of 2004 MAP Results for eMINTS Students*, (Missouri: University of Missouri-Columbia, 2005).
[18] Office of Social and Economic Data Analysis, *Analysis of 2005 MAP Results for eMINTS Students*, (Missouri: University of Missouri-Columbia, 2007).
[19] Cheryl Lemke, Crystal Martin, *One-to-One Computing in Virginia*, *A State Profile*, (Virginia: Metiri Group, 2004).
[20] Susan Lowes, Cyrus Luhr, *Evaluation of the Teaching Matters One Laptop Per Child (XO) Pilot at Kappa IV*, (New York: Columbia University, 2008).
[21] Fresno Unified School District, *HP Mini-Notebook PC Bring Down Cost, Footprint of Classroom Computers*, (California: Fresno Unified School District, Western Blue, 2008).
[22] Department of Education, *'One Laptop per Child' Pilot Project Will Give Personal Computers to State's Youngest Students*, (South Carolina: Department of Education, 2008).
[23] Erin Stock, "Students at Birmingham's Glen Iris Elementary Get Hands on XO Laptops", *The Birmingham News*, 30 April 2008.
[24] Marie Leech, ""Birmingham School Board Accepts Remaining 14,000 XO Laptops", *The Birmingham News*, 8 July 2008.