

PRE-PUBLICATION PREVIEW

The Experts' Guide to the Postsecondary Market

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Software & Information Industry Association
1090 Vermont Ave, NW
6th Floor
Washington, DC 20005
Phone (202) 289-7442
Fax (202) 289-7097
www.siiia.net

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The Software & Information Industry Association is the principal trade association for the software and digital content industry. SIIA provides global services in government relations, business development, corporate education and intellectual property protection to the leading companies that are setting the pace for the digital age.

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Five Things You Should Know About the Postsecondary Market

Mitchell Weisburgh

In the midst of five different transitions, the postsecondary market in the U.S. is more complex than ever before. To create winning products or services, you will want to know about the following new realities:

- 1 market size and demographic trends
- 2 the impact of online courses and content
- 3 the new focus on accountability
- 4 the hot technologies
- 5 how students access their content and classes

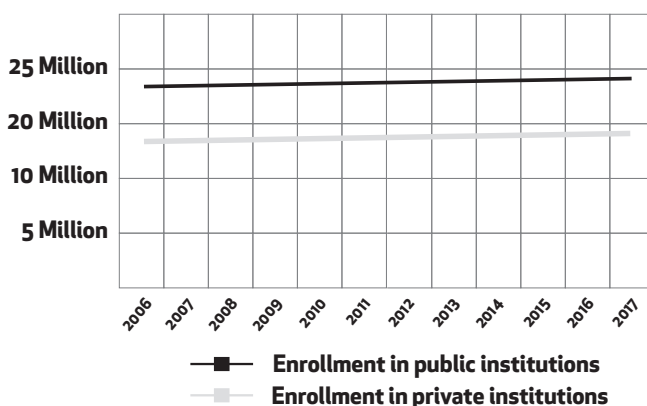
This concise introduction to these topics will help you meet the changing postsecondary market needs.

Market size and demographics

More than 6,500 postsecondary institutions give degrees¹, while serving approximately 20 million students annually. More than half, 57%, of postsecondary students are female. About 60% of the students enroll in four-year programs, 30% in two-year, and about 10% in graduate or less than two-year programs. Thus, in any one year, approximately equal numbers of students start two-year and four-year programs.

The ten-year outlook for growth in postsecondary enrollments is not positive. In fact, as shown in the Projected Enrollments chart, in the main age group from which colleges draw, 18-to-25-year-olds, there is a projected decrease in over the next five years.

Projected Enrollments



Postsecondary education is usually counter-cyclical; that is, when the economy worsens, people upgrade their

skills by returning to school. Enrollments for 2008-9 grew at 4.8%, significantly above the 2.6% rate of yearly growth the previous year.² Enrollments are likely to remain at elevated levels as long as the employment outlook is bleak.

To make up for the lack of growth in the traditional postsecondary population, institutions are looking at five major initiatives:

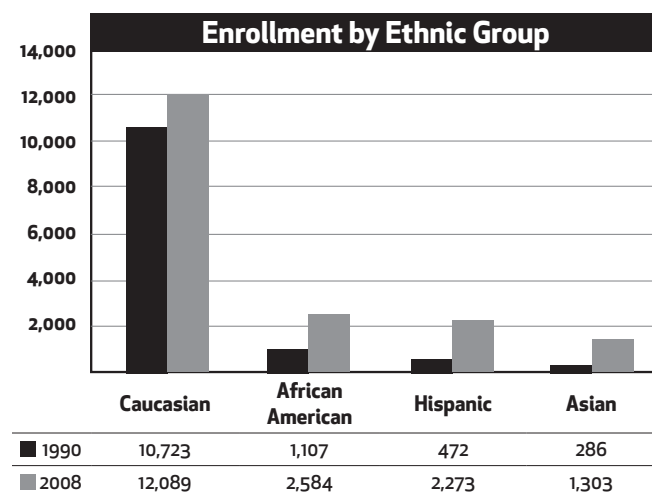
- ▶ increasing diversity
- ▶ reducing costs and demonstrating accountability
- ▶ tying curriculum to jobs and occupations
- ▶ shrinking dropout rates
- ▶ increasing online offerings

With limited growth in the overall postsecondary market, publishers will do well to position their products as meeting one or more of these needs.

One aspect of increasing diversity is to target older learners directly. The Postsecondary Enrollments by Age

Postsecondary Enrollments by Age Groups	2005	2008	2012	2017
18 to 24 enrollments	10,460	10,964	11,518	11,672
25 and over enrollments	6,828	7,045	7,340	8,198
Total 18 and over enrollments	17,289	18,009	18,858	19,869
18 to 24 CAGR		1.6%	1.2%	0.3%
25 and over CAGR		1.0%	1.0%	2.2%
Total CAGR		1.4%	1.2%	1.1%

Groups table³ shows anemic growth in postsecondary enrollments from the traditional 18- to 24-year-old age groups, but stronger growth in older learners beyond 2012. This age group is primarily interested in upgrading job skills. While overall enrollments are barely increasing, Hispanic enrollments have been growing at over 9% per year and Asian enrollments at over 8% since 1990. See the chart Enrollment by Ethnic Group. Growths in Hispanic, Asian, and African-American enrollments are expected to continue to surpass that of Caucasians for the foreseeable future.⁴



Growth in online delivery

More than 4.6 million students were taking at least one online course during the fall 2008 term, a 17% increase over the number reported the previous year. In 2009, about one-third of all students had taken at least one course online.⁵ This growth rate for online enrollments far exceeds the 1.2% growth of the overall higher education student population, pointing to a decrease in traditional course enrollments.

In all courses, there is also an increasing use of online content sequenced into the course. Sales of digital textbooks in postsecondary are expected to grow from 1% of content sales in 2010 to more than 18% in 2014, exceeding \$1 billion.⁶ In contrast, overall content sales are projected to grow at an anemic 2%.

This change may signal movement toward disaggregated content and away from the bundled textbook. The content includes both paid and free assets such as taped lectures and open-university resources.

The table Evolution of Classroom Materials highlights some of the changes in the way classroom materials are used.

Evolution of Classroom Materials

Traditional Textbook Market	Current Postsecondary Content Market
Students purchase textbook based on course requirements.	Student purchase specific resources; some resources are free.
Most textbooks are purchased from the college bookstore.	There are many sources for students and less reliance on the college bookstore.
There's an active used textbook market.	Annual subscriptions, rental programs, availability of free resources eat into used market.
In large courses, textbook publishers put together customized textbooks and online materials.	Customized Virtual Learning Environments for large courses or institutions are available.
Students highlight and take notes in their textbooks.	Lecturers and students tag, modify, and share online materials with each other, sometimes running into copyright issues.

Accountability

Just imagine any other market with the following statistics, and you'll understand some of the reasons that there is so much pressure for accountability.

- One-third of the raw materials need special handling. Approximately a third of all incoming students are not capable of college-level work in math, reading, or both. These students need remediation, at a cost to colleges of \$1 billion per year nationwide.⁷
- Half of all work is never finished. But many customers have to pay anyhow. Only half of all college students finish with a degree or certificate, something that has remained constant for the last 50 years. Studies indicate that there is little economic value to attending college without completing a degree. Yet, students still have to pay for the courses that they've registered for and the loans they have taken.
- Up to 30% of customers default on payments. An average of 40% of students at two-year, for-profit colleges default on their loans, and 31% of community college students default.⁸

These concerns are prompting the federal and state governments to take a closer look at accreditation, accountability, and allowing students to continue to access federally guaranteed loans at institutions that do not achieve targets.

Availability of student aid is a critical concern to the for-profit institutions. At the for-profits, 88% of students take out loans, while fewer than 20% of community college students do. See the following table that shows the average yearly tuition and fees for students at different categories of schools

in the 2000-01 and 2009-10 school years.⁹ In addition, the average student pays between \$1,100 and \$1,300 for books and supplies per year.

Average Annual Tuition and Fees			
	Costs 2000	Costs 2009	CAGR (Compound Annual Growth Rate)
Public 4-year in-state	4,376	6,393	4.2%
Public 2-year in-state	2,230	2,970	3.2%
Private not-for-profit 4-year	16,094	21,050	3.0%
Private for-profit 4-year	13,100	15,715	2.0%
Private for-profit 2-year	11,291	14,280	2.6%

To deflect criticism and accommodate what will likely be tougher standards, postsecondary institutions will be placing increased emphasis on and perhaps need help with four major challenges:

- ▶ developmental courses
- ▶ measuring time on task and learning
- ▶ student retention and dropout prevention
- ▶ helping their students prepare for and obtain jobs

Mobile and social networking

Along with the growth of online learning are the growth of mobile learning and the increased use of social networking. Nielson predicts that by the end of 2011, most cell phones in the U.S. will be smartphones, and reports that as users become more accustomed to using smartphones,¹⁰ their data consumption quadruples in a year.¹¹ With the growing use of smartphones, iPads, netbooks, and e-reading devices, campuses will need expanded network capacity to meet the demands of students who want to learn wherever they are, whenever they want to, and on whatever device they want to use. Interoperability of systems like Learning Management Systems and content will be key issues.

Two-year schools present additional challenges and opportunities because many students live off-campus with limited access to computers and high-speed Internet connections. These students often perform their work from school computers at libraries or computer labs. As the price of netbooks, tablet computers, and e-reading devices become more affordable, these will become more ubiquitous in two-year schools as well.

In addition, electronic collaboration has increased. Institutions and students are implementing software with collaboration features, such as conferencing, desktop and file sharing, blogging, student and group portfolios, wikis, project

management, and connections to social networking sites like Facebook and Twitter.

As institutions attract more students from around the world, including attendees of massively scaled courses, there will be rising demands for accommodations for different languages.

Changes to the learning infrastructure and LMS

A Learning Management System (LMS) is now in about 90% of postsecondary institutions in the U.S. As institutions face increased accountability, growth in online learning, multiplication of devices, emphasis on collaboration and the social web, along with cost pressures, more than half report that they are considering changes in their LMS over the next three years.¹² The changing role of LMS is reflected in the diagram at the end of this article, The Learning Management System in 2015. It shows the initial roles of the LMS in the center with many spokes as LMS is transforming into an enterprise critical application. Software and content publishers essentially have three choices:

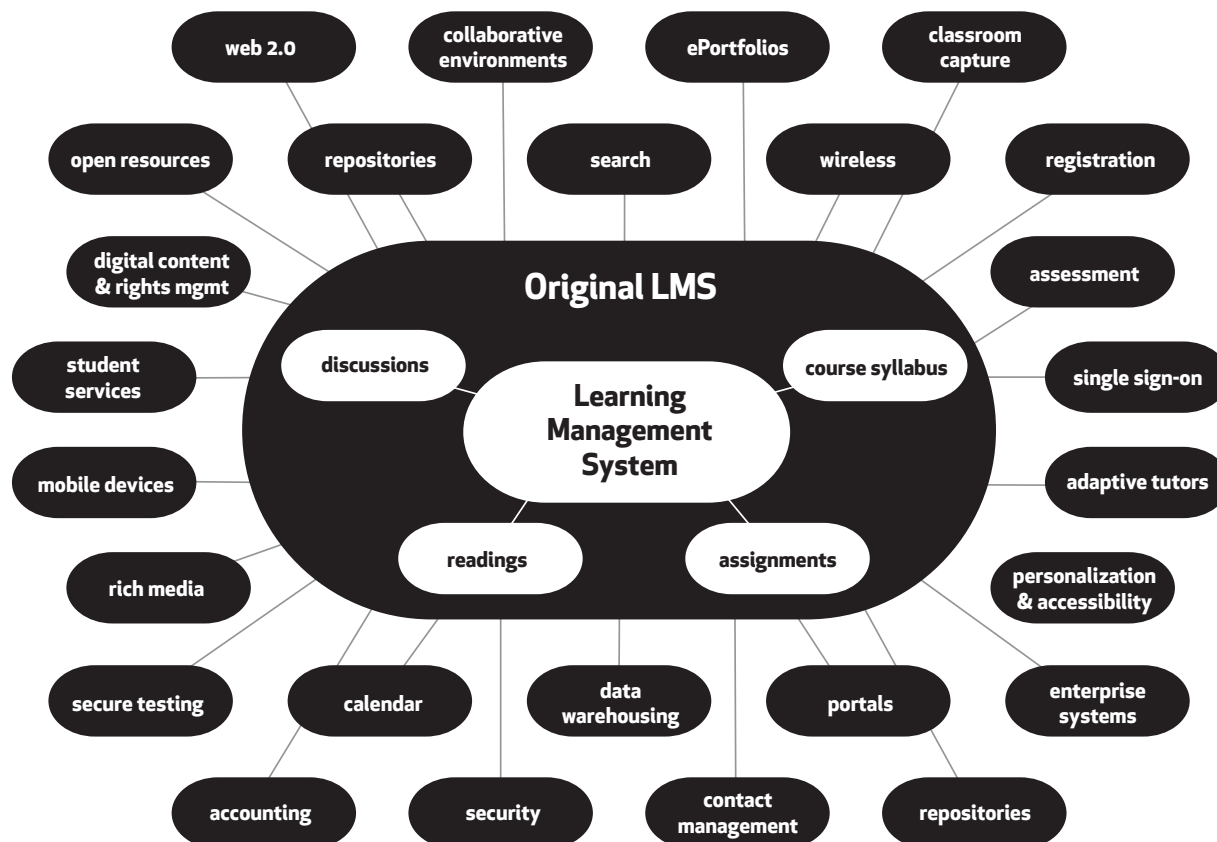
- ▶ Fit your content into capabilities of existing LMS's.
- ▶ Devise new tools that are either standalone or can expand the popular postsecondary LMS's.
- ▶ Create your own LMS for your content or systems; decide if you want to make it standalone or if it will also fit into other LMS's.

Conclusion

One meaning of abductive reasoning is including parameters for the unknown, in essence, developing under uncertainty. Certainly, much uncertainty exists in the postsecondary market. Good abductive reasoning will lead to a novel conclusion that is by no means necessitated or even made probable by its premises, but which upon retrospection, is decided to be the best conclusion. Abduction is the logic of invention or discovery.

We can hypothesize that institutions will seek products and services to target students from non-traditional populations, reduce costs and inefficiencies, harness the hottest technologies to promote more learning, and integrate all the technologies that they deploy. But no one can deduce precisely how institutions will respond to the new realities of demographics and diversity, tension between print, face-to-face, and online, burden of greater accountability while reducing costs, mobile and social networking technologies, or new demands on LMS's. Yet anticipating how to develop winning products and services to help them meet these challenges is what makes this market exciting.

The Learning Management System in 2015



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ABOUT THE AUTHOR

Mitchell Weisburgh Mitch is a founder and Managing Partner of Academic Business Advisors, where he works with ed-tech companies on growth strategies for the education marketplace. He is a co-author of the SIIA's Postsecondary Market Report, and runs the PILOTed blog at www.academicbiz.typepad.com. Before co-starting ABA, Mitch has designed LMS's, written courses, taught, and run companies.

Accessibility by Design

Stephanie Weeks

To judge a product's accessibility, the most common question used is, "Do you comply with Section 508?" Section 508 guidelines are a common reference for accessibility in general because in the U.S. IT industry, these (www.section508.gov), along with the W3C guidelines (www.w3.org/WAI), and other standards inform us how to assess the accessibility of a product. But how does a product development organization move from being minimally compliant to truly offering a product experience that is highly usable and desirable in a sustainable way for the business? The answers are 1) by creating a culture that understands the problem well enough to routinely build an accessible product rather than relying upon only testing post-development; and 2) by creating partnerships that help design new experiences in an accessible way.

Empowering the product team

To empower a team to solve a problem such as how to make an accessible product experience, first provide context on the problem itself. Understanding context does not require formal training or expensive trips. It simply requires spending time with the people who experience the problem. For example, a blind user was invited to test Blackboard software with our development team present. No report enumerating compliance bugs would ever compare to watching this user struggle to complete just the most basic tasks. He even asked one of our sighted developers to try using his screen reader: The developer was unsuccessful in completing the task.

The point was made quickly and effectively: What we had been doing for accessibility was not working. Everyone in the room knew we needed to take action, and the team immediately had ideas about how to make improvements. Empathy in context was now rooted in the team, and we could work effectively in creating ways to resolve the problems. Ideas about how to achieve a better product experience for blind users naturally followed. But just as important, this context raised questions about what other problems might exist for users with different disabilities.

Second, as product vendors, we need to ensure that our products are accessible even when we have no awareness of a specific user who needs a more desirable approach. Will there ever be a person with a disability who might need to use your product? It's important to understand that this consideration is not just about asking if there are any blind users of your product, for example. Accessibility is being concerned about those with broken limbs, older users with diminishing eyesight, hearing, or dexterity, and more. Think about more than the obvious to understand that there will always be a need for truly accessible products that go beyond meeting the basics of Section 508 guidelines. There will

always be a need to find opportunities to better express the existing problems to the product organization.

Creating a sustainable approach

When you are designing a completely new product, you have the advantage in considering accessible approaches. But product development organizations looking to improve the user experience of their existing product have an initial hurdle to overcome before accessible approaches can be systematically applied to the organization. You must make a significant improvement from a product experience that is difficult to use to one that makes sense for users with disabilities. Whether you approach the product improvements one module, feature, or widget at a time or all at once, you need to make progress before deeply engaging users for feedback or doing any significant testing.

At this stage, it can be ineffective to move through a list of compliance bugs one by one. Rather, we needed to rethink our approach. Were there any types of pages on which we standardize the header structure? Which tasks are most critical in the system? Which tasks are similar in workflow? Which types of pages returned similar types of compliance issues? Breaking the system into page and workflow types gave us the ability to discuss the system more holistically. A team could then consider how to make improvements to large parts of the system at once. Critically, the cross-functional team that worked on these considerations consisted of representatives from design, development, and testing. All of them became well versed in accessibility standards by researching the guidelines and by trying various assistive technologies with the product.

Our experience strongly suggests that creating a single, separate team responsible for accessibility is not an

effective solution for resolving accessibility challenges. The more effective strategy is to empower everyone, while also developing key leaders throughout the organization from the design, development, and testing groups to act as a team, but yet whose roles are not solely dedicated to accessibility. These leaders are specialists in their areas with experience in understanding user problems within accessibility and in devising system solutions. Then those key staff members share that experience as they coach and develop this expertise in their functional peers. The result is an organization wherein everyone's role is to do his or her job with accessibility in mind.

Once the team implements the initial set of improvements, we could engage users to provide feedback on the new experience. Also, we could engage a third-party testing partner to provide feedback on achieving compliance with the standards, as well as support for more challenging areas of the product.

Not everything needs to be perfected before releasing improvements. Users with disabilities benefit from an improved experience, even if only a small improvement. It is important to communicate to your customers and potential customers what has improved and that you plan to continue similar efforts in the remaining areas of the product. In fact, this communication not only informs your customer base, but also provides you with an opportunity to find customers who are interested and have the experience to partner with you on future enhancements. Continuous releases demonstrating improvements each time build trust. You show that your product is on its way to meeting customers' needs and that your product will remain relevant. Best, your customers will increasingly become satisfied.

Succeeding in new development

Once an organization achieves a desirable experience for all users on the existing product line, it can develop new features with much less investment because the first design will have accounted for accessibility. Still, customers and end users are the best partners in designing new features because they have a variety of needs, assistive technologies, and know what does or does not work for them. Each time Blackboard designs a new workflow or front-end interaction, we work with a group of four to eight end users who have different disabilities and expertise in different assistive technologies. We collaborate with them to ensure the workflow and interactions will work well. In 100% of these discussions, the design changes discussed improved the user experience for all users, not just for disabled users. This collaboration results in better-designed, more accessible products, as well as a group of customers who can tell the story of your company's commitment to their needs.

We also approach development planning with accessibility first. If a team requires new research for how to deliver the feature in an accessible way, they build that research into the schedule early to make certain that it is built accessibly first.

Once the design is well understood and development has progressed, we have found that a professional testing vendor is the best partner in finalizing the development, ensuring all of the bugs are discovered and priorities are correct.

Beyond product development

A group who designs, builds, and tests the product will continue to develop a richer understanding of how to deliver the best product experience. Nevertheless, that team is only a part of the overall solution for a product provider. To be a company that understands the needs of its customers, those who support the product, and those who support or communicate with customers must also receive at least basic training about accessibility.

Recommended training includes the following:

- ▶ awareness of and empathy for what it means to use an inaccessible product versus an accessible product
- ▶ understanding of the variety of assistive technologies that may be used with our product so that support and client management professionals can understand any potential issues being reported to them
- ▶ attentiveness to the procurement policies of potential customers so that client management professionals are well versed in how well the product meets those needs
- ▶ a common understanding of the priority of accessibility issues if customers report them

Providing customer visibility into accessibility

Transparency is a common request among user groups: "Just tell us what works and what does not work." There are many ways to support this communication. At Blackboard, we have found it effective to market this information directly and indirectly, which requires training marketing professionals, as well as strategic partners.

According to our focus groups, informing customers and prospects that a third party has confirmed a product's level of accessibility is more meaningful to them than our stating that accessibility is based on our own testing. Investing in third-party verification helps strengthen your brand by securing trust and authentication from your customers.

An additional type of partnership that has proven invaluable is with an advocacy group in the accessibility industry. We have partnered with the National Federation of the Blind (NFB), who is interested in seeing improvements

in learning management systems. This partnership benefits both groups' initiatives. The NFB has certified Blackboard Learn for non-visual access, has awarded us the prestigious honor of the Dr. Bolotin award for groundbreaking work in accessibility, and has provided the valuable connection to the blind community that will continue to keep us aware of that community's needs and help us communicate our progress to that community. The NFB is able to express to their members that their work in advocating for equal access in this arena has made a significant difference. Further, they are able to direct their constituents to specific software that they know meets their needs. This type of partnership is most effective once the majority of the design, development, and testing efforts are well underway.

Conclusion

Accessibility is a core part of the education technology business, from product strategy to development, marketing, support, and maintenance. While it requires investment, planning, and thoughtful execution, the return on investment is satisfied customers, a broader range of potential customers, and brand recognition as a company that understands their clients' needs. Your products can achieve success in being desirable experiences when your company creates a culture of understanding throughout the organization, infuses teams with an understanding of the problem and access to customers, and partners with organizations that can help inform customers of meaningful achievements.

ABOUT THE AUTHOR

Stephanie Weeks is Blackboard's Senior Director of User Experience, which includes functional, visual, and content design, plus usability and accessibility assessment. She loves design and its process: listening to clients, watching users, and collaborating to integrate concepts into something new and enjoyable. Stephanie received her BS in Computer Science from Kennesaw State University and her MS in Computer Science from The George Washington University.

In-stock Date for the eBook Promise is Still “NYP”

Paula Maylahn

The first mention of an eBook for use in education has been traced to Robert A. Heinlein’s 1948 science fiction novel, *Space Cadet*, in which “students used information ‘spools’ which are displayed with projectors on their study desks”.¹ Actual eBooks (basic PDF or HTML digital version of printed textbooks) became available about 40 years later. Yet today, despite the plethora of eReader devices, digital-native student populations, universities’ eBook initiatives and publishers’ media-neutral XML workflows, eBooks represent less than 1 % of college textbook sales.² Combined with all that has been written about digital textbooks’ ability to drive down costs for both students and publishers, you would have thought the percentage of eBook sales would be greater. So what’s the eRub?

From the publishers’ side, the challenges of digital textbooks aren’t really about the digital content. Publishers have been dealing with digital content for several decades. After all, authors submit digital manuscript from the start. Even for printed textbooks, the content pretty much stays digital up until ink hits paper on the printing press. The rub for publishers is digital context: How and where will content be rendered?

Devices

Digital textbooks can be rendered on a variety of devices. And each device determines how content can be displayed:

- ▶ computers/laptops
- ▶ dedicated eReaders
- ▶ multiuse eReaders/tablets
- ▶ smartphones

According to a survey of publishers, **computers and laptops** are still by far the most-supported eBook devices: 35 % of postsecondary publishers produce eBooks that can be read on PC/Mac. Dedicated eReaders came in second with 28 % of postsecondary publishers preparing content that can be read on Amazon Kindle and all other eReader devices combined.³ Computers have the biggest screen real estate, which make them uniquely suitable for PDFs created from textbooks laid out for print. Since PDFs are static, they ensure the integrity of pedagogy. No funky word breaks appear, and that callout box will be right where the author intended. Across all publishing segments (trade and consumer, professional, postsecondary, and K-12) more than 50 % of all eBooks are in PDF format.

The key selling point of **dedicated eReaders** is re-flowable, re-sizeable text. Another major feature is their use of eInk technology, which simulates the traditional reading

experience. If you’ve read from your computer screen for an extended time, you know all about the eyestrain caused by LCD screens. The added benefit of eInk is that it uses much less power than LCD. So battery life is calculated in days/weeks instead of hours. The downside for textbook publishers is that eInk can’t accommodate color, let alone interactive eBook content other than audio.

Multiuse eReaders/tablets offer the most promise for realizing the interactive potential of eBooks. Designed for more than just reading, they have color, beautifully render graphics and multimedia, are web enabled, and have decent screen real estate that minimizes scrolling and zooming. A dual screen device, the Entourage Edge, with one eInk screen optimized for reading and one LCD screen for color (and for taking advantage of all the cool stuff), attempts to blend the best of both worlds.

Last and smallest (but not least) are **smartphones**. With 99.8 % of college students having a mobile phone, “smart phones are accounting for more of their electronic communication and computing needs....”⁴ With the focus on reducing college costs, developing content for a device students already own makes sense. And phones already have a proven track record for delivering educational content. Just ask the 20 million people in China who receive English Language instruction via Nokia’s Mobicedu service.⁵

XML content management strategies (device-neutral structured content tagging schemes) enable publishers to move their content across all these platforms and any other device that may turn-up in the first part of the 21st century. However, not all education concepts and pedagogy move across devices as easily. So while publishers are now better positioned to render content on any device students may want, the context of where the content is being read may make it unusable for effective teaching and learning.

Interoperability

Because of the lack of a common technical standard, not all devices read all eBook formats. And newer devices may not read older eBooks. The proprietary format of Kindle locks you into purchasing books from Amazon. EBUB, the open eBook standard, has the potential for creating digital world peace. Developed by the International Digital Publishing Forum (IDPF), the international trade and standards organization for the digital publishing industry, EPUB enables publishers to distribute a single file format that will re-flow text according to whatever device it ends up on. It's free, supports Digital Rights Management (DRM) and incorporates Daisy XML, the standard for making books for accessible people with visual disabilities. Many new dedicated and multiuse eBook readers are adopting the EPUB standard. However, EPUB is optimized for text-only content. So as an evolving standard, it has a way to go before it is robust enough to handle complex college textbook content.

Accessibility

The Americans with Disabilities Act of 1990 (ADA) and Section 504 of the Rehabilitation Act of 1973 prohibit discrimination against people with disabilities—including individuals with visual disabilities. It prohibits the use of an emerging technology in a classroom environment when the technology is inaccessible to an entire population of individuals with disabilities unless those individuals are “provided accommodations or modifications that permit them to receive all the educational benefits provided by the technology in an equally effective and equally integrated manner.”⁶ Making content accessible could include converting to Braille or audio format, but generally disabled students must wait for the adaptation of the materials their classmates are already using.

In 2009, the U.S. Department of Justice supported advocacy groups that cried foul when an eBook pilot program at Arizona State University (ASU) didn't take into account the needs of vision-impaired students. Unlike printed textbooks, digital textbooks that have text-to-speech (TTS) technologies can be accessible from the get-go. But plaintiffs complained that the Kindle DX was inaccessible to blind individuals because the menus and controls displayed visually only, with no audio option. Although the Kindle DX rendered the text of books audibly using TTS technology, the menus and controls themselves lacked TTS. As a result, blind individuals could not configure settings, select books, or even turn on the TTS feature. So ASU and the Department of Justice came to an agreement (which was subsequently agreed to by other postsecondary institutions) stipulating that devices adopted for eTextbooks, even in pilot studies, must be accessible to individuals who are blind or have low vision.

Business models

The big promise of digital textbooks has been the cost-savings. An estimated 20% to 30% of a textbook's sales price is saved as costs for paper, printing, binding and shipping are all taken out of the equation. For publishers the big promise of digital textbooks is eliminating the used textbook market. Publishers and authors make money only on the initial sale of printed textbooks. With eTextbooks, all sales will be the initial sale. Publishers don't have to build a business model based on an unnaturally forced two-year new edition publication cycle (which is no fun for publishers either). Both publishers and authors can reap the rewards of long-tail sales.

eChapters

Digital textbooks also open the door to other cost-saving options for students. As with digital music, where they no longer have to buy the whole CD to get just the songs they want, students can purchase only those chapters they want when they want them. While not all content lends itself to disaggregation and de-sequencing, it works fine for many academic concepts. Professors rarely require students to read every chapter of the textbook.

Licensing

Another cost-saving option for students is licensing. The huge used textbook market highlights the fact that most students don't keep their tomes after they have completed coursework. Licensing digital content is analogous to renting a printed textbook. The student licenses the material for the length of the semester or for several semesters. Once the license expires, the student loses access to the online content, as well as any content downloaded to his or her local device. However, during the licensing period, students do have the ability to print content, though quantities are monitored for possible abuse. Since paper printouts don't disintegrate when the license expires, having a printed keepsake is an advantage of digital licensing over textbook rental.

Licensing is also an option at the institution level. It is a common model for online colleges that brick and mortar institutions are currently exploring as well. Similar to corporations buying software licenses based on the number of users, postsecondary institutions are starting to purchase site licenses for digital textbook content. Students pay a materials fee that is a fraction of even a used textbook's cost. Publishers get to realize significant revenue, but have to process only one invoice.

It's really not about price

Despite all the emphasis on cost savings for students, low costs won't be a driving factor if students can't get what they want. Consider the joke about the cheap all-you-can-eat restaurant that just opened: Their food is terrible, but at least they serve big portions. Currently, there's a proliferation of eBook options for students, but the menu is very limited. The majority of eTextbooks don't take advantage of multimedia pedagogy and the personalized learning that the technology enables. In fact, eTextbooks are most often translations of printed textbook into formats that actually compromise the value of much of the pedagogy available in print. Further, rights and permissions issues can prevent images being included in a digital version of a print book.

What students want

According to a study conducted by the National Association of College Stores (NACS), 74% of college students prefer print and 53% "would not consider" buying digital textbooks.⁷ These figures just don't jibe with the archetype of the digital native, the largest demographic of college student populations. And the explanation proposed, that innovations take time before they are widely adopted, doesn't jibe either. Nothing has been slow about the adoption rates of iOS devices (iPhones, iPads and iPod Touches). So what's the real rub?

Familiarity

One aspect may simply be that for studying, students are most comfortable with a format they already know. For freshmen transitioning out of high schools, where mobile devices are generally banned from classrooms and 1-to-1 student-to-computer ratios are widely unrealized, printed textbooks still rule. In its first two semesters of selling print (and other formats) to budget-strapped students around their core offering of a free online textbook, Flat World Knowledge has seen almost 40% of students still opt to purchase printed versions.⁸ And of course the rapid growth of Chegg and other textbook rental sites that compete with the incumbents own less successful eBook collections, indicate students' preference for print.

Screen size

Though an index in a printed textbook won't win the race against a search engine and will lose in the backpack weight competition as well, printed textbooks are fairly functional when compared to other devices. Many printed textbooks are 8-7/8" x 10-3/4". For complex material and concepts, authors will often use the full open book real estate, which for book size just mentioned is 17-3/4" x 10-3/4".

In contrast, the screen size of the popular iPad is only 7.75" x 5.82", screen dimensions for even the larger

dedicated eReaders are even smaller at 7.75" x 5", and the screens on smartphones are, as you know, tiny.

As a result, much of the pedagogical content prepared for printed textbooks won't work well when simply converted to render on electronic devices. Materials need to be developed with the rendering context in mind. XML allows for device-neutral content management. But academic authoring isn't a device-neutral activity. Only one device, the Kno, scheduled for market release December 2010, attempts to replicate the open book experience. It will have dual 14-inch LCD screens capable of displaying a two-page spread.

Functionality

There is an array of features and capabilities available across various devices and platforms:

- ▶ eInk
- ▶ touch screen navigation
- ▶ audio/video
- ▶ Wi-Fi
- ▶ synchronization across devices
- ▶ ability to add memory
- ▶ ability to add storage
- ▶ ability to add or customize content
- ▶ ability to share with online communities
- ▶ and, ironically, the ability to print

Yet, there are only two must-haves for every student who will be studying for an exam:

- 1** highlighting
- 2** note-taking

Students can perform these tasks on most devices, even on some eInk ones. Yet the user experience is poor. Lack of color highlighting capabilities (on eInk devices), difficulty highlighting long passages, inability to annotate PDFs on some devices, awkwardness of using small keyboards, and inability to organize notes make these activities time-consuming and reduce their effectiveness for studying. Also impeding efficacy is the speed of review available for those highlights and notes. Flipping through a printed book while cramming for a test is still faster than scrolling, zooming, and waiting for pages to refresh.

The future

Despite the challenges of cost effectively producing eBooks—such as creating content that is pedagogically sound on all possible devices, plus the issues of lack of interoperability, emerging technical standards, ease-of-use, and business model uncertainty—publishers continue to develop eBooks and increasingly students are buying them, albeit at modest rates. Projections for market share growth vary. However, with multiuse eReaders being developed specifically for the education market and with content development of the interactive pedagogy they enable, it is only a matter time before the eBook finally delivers on its promise.

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ABOUT THE AUTHOR

Paula Maylahn is an independent education industry consultant. Formerly a Senior Vice President at Pearson, Paula held a variety of management roles in both their K-12 and Higher Education organizations. While in Pearson's Higher Education and Professional Group, Paula oversaw design, content management, production activities and marketing communications for print and digital products in their STEM division. Paula implemented tagging systems to facilitate the conversion of published content into SGML/XML and helped formulate digital publishing standards in such problem-prone areas as advanced mathematics, chemical notation, molecular modeling and complex technical illustrations.

