

# **Digital Delivery of Course Content: Is Johnny Reading?**

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## **Abstract**

In the Fall of 2010, after the school of business at Virginia State University implemented a digital delivery system for course content via Flat World Knowledge in nine of the core business courses, a representative of one of the traditional publishers challenged the move by asking “how do you know the students are reading the digital textbooks?”. The comment and the retort “how do we know they were reading your textbooks?” highlight one of the primary dilemmas in the transition between traditional textbooks and digital content.

We still don’t know whether students are reading course content but online behaviors leave a trail that is easy to follow and significant amounts of data just waiting to be crunched. We know when a student registers for their digital textbook, when they download digital content and what digital content that they are downloading. There is great temptation to want those behaviors to suggest something meaningful about the efficacy of online content. But, while we will continue to have access to more and better data, without a way to track similar behaviors for traditional textbooks, these comparisons can be dangerous. This is not to suggest that this information isn’t valuable. It is simply to suggest that care must be taken not to speculate about improvements in content delivery without better ways to measure those improvements.

## **Introduction**

In the Spring of 2010 the School of Business at Virginia State University initiated the necessary steps to implement an integrated core curriculum. As part of this process the school began to explore ways to improve student experience around course content. Student retention was the primary motivation for this initiative. Only 42% of students were purchasing textbooks for their courses. Without textbooks, it was reasoned, students will quickly fall behind and, as they realize they are in danger of failing, will drop courses. This was not merely conjecture. The faculty have seen students ‘disappear’ from classes at an alarming rate at the end of the add/drop period. Faculty also regularly advise upper class students and can see the number of times a student will retake a class.

One of the main reasons that students don’t buy textbooks and other course material is the rising costs of those resources. As the cost of traditional textbooks continues to rise, an alarmingly large number of students have decided not to purchase them. Other students are financially unable to bear the costs. In fact, the cost of textbooks is a major reason that many students drop out of college, according to a Public Agenda research report for the Bill & Melinda Gates Foundation. Even for students who remain in school “This trend introduces inequality into the classroom, in that some students have the required learning materials to succeed in the course while others either do not”(Buczynski 2006).

It was felt that affordable textbooks would be a positive factor to help solve this problem. The publishers of traditional textbooks offer digital, e-book versions of these textbooks at a substantial discount, but these were rejected for being a limiting solution. Although they were often less than half the price of traditional textbooks, many required an online connection and

most, at that time, limited student access to a short time window. It was also suggested by some faculty that we needed a solution that did more than simply mimic a traditional textbook. Digital content has a number of properties that, not only make it an attractive alternative to printed material, but also increase the modalities through which that material can be delivered.

From a pedagogical perspective digital content has a number of potential advantages. Brown and Edelson (2003) present “a professional development model aimed at increasing teachers’ capacity for designing learning activities by customizing and combining online learning resources to fit their local needs and context” (Recker et al. 2007). Digital content can be accessed via the web, which means that instructors can create links in their LMS that will not only guide students to a digital textbook, but can also send them to a specific chapter or page within that textbook. Digital content, with the appropriate copyright, is also easy to modify or supplement and instructors can make changes that reflect their point of view or relevant recent events. This gives an instructor unprecedented flexibility to incorporate digital content into their course design.

Another reason to incorporate digital content into the classroom involves the students’ understanding of the relationship between information and technology. According to Prensky (2001), in the new information age, our students are “digital natives”. They have grown up in an era where access to information is easier than it has ever been. A google search will instantaneously turn up an overwhelming amount of information on almost any subject and so students have learned to navigate digital resources. “Digital natives move quickly through information and prefer to seek out answers actively, rather than wait passively” (Zimmerman and Milligan 2007). One way to accommodate the digital native is to leverage their expectations for

digital course content by using material that allows for word-level search, bookmarking, digital comments, and even not sharing.

When, in Fall 2010, Virginia State University first adopted Flat World Knowledge digital textbooks in the core business school curriculum there were a number of challenges to the process. The loudest came from the traditional publishers who asked how we would know whether students were ‘reading’ the digital content. It was a good question, although not necessarily germane. We have always wanted to know whether students are reading their textbooks because we associate that activity with the learning process. Therefore, when we test students, we make assumptions about the amount of work they have done; including whether they have read their textbook.

We cannot, however, make a direct connection because we don’t directly measure that activity. As we transition to digital content, we discover a number of things we can measure that we haven’t been able to measure before. When Virginia State adopted the Flat World Knowledge textbooks we discovered that we were now able to know which students had registered for textbook access and what files those students subsequently downloaded. This paper will report on these metrics and discuss what they may, or may not, mean in terms of learning and student success.

### **Digital Content and Seat-Licenses**

In partnership with Flat World Knowledge (FWK) publishers, the Reginald F. Lewis School of Business at Virginia State university developed a seat license program for nine courses in the school’s core business curriculum. Students taking these classes would receive a seat

license which, once registered, would provide access to an online version of the course textbook as well as other file formats. For the Reginald F. Lewis School of Business, the ability to use content without an Internet connection to the FWK website was crucial to making content more accessible for students. A student can go to the FWK website and download content to their e-reader, their computer, their mobile device, or even a jump drive. Faculty members can even provide chapters for download in their Blackboard accounts. Once students download chapters, Mp3s, mobi or epub files they do not have to be online to read that read or listen to that content.

Although our primary goal for the adoption of digital content was to make this material more accessible to students, this accessibility came with the additional benefit of an increased ability to track certain student behaviors surrounding the digital content. This should not have been surprising. We all leave digital footprints as we work and play in web-based platforms. If you tab to the history page on Wikipedia you can see how any article was built from the first posted contribution. You can know who has contributed, what they have contributed, and when they have made those contributions. A more limited type of oversight is available on the Blackboard LMS. You know when students visit your course in Blackboard, which parts of the site they visit, and how often they are there.

So it was with the Flat World Knowledge digital content. Although we are not yet able to determine if or when students are ‘reading’ their textbook online, we were able to ascertain which students had registered their course seat-licenses and which files they subsequently downloaded. On the first day of class, for each of the courses using FWK digital content, students were given a registration form; each with it’s own unique registration number. The form provided a web address where the students could register to gain access to all the materials

available for that specific course. Students taking multiple courses with FWK seat-licenses would need to repeat the procedure for each course.

Since students needed to register their seat license, Flat World was able to report who had registered and for which course. We were subsequently able to extrapolate from the class lists who had not. What was most surprising to us, in the first semester of this project, was not all students registered for their free digital content. We tracked student registration for the first four weeks of the semester, beginning on August 23rd. By the end of the first week just under 44% of the registered students (361) also registered for their FlatWorld textbook. On August 30th, after the weekend, the number rose to 61% (507) and then to 80% (652) by the end of that week.

After that registrations slowed dramatically. We examined the registrations by class to determine who had, and hadn't, registered their textbooks. Instructors were given list of the students who hadn't yet registered their textbooks and were asked to 'remind' students to sign on and register. Ten days later, on September 15th, 671 students (84.5% of the students enrolled in the courses) had registered for Flat World textbooks.

### **Registration and Higher Grades?**

Since students needed to register their seat-license, and we could identify those students we were in a unique situation of being able to compare the grades of students who had registered their seat-license with those who had not. We thought that, as with traditional textbooks, students would be less likely to succeed in the classroom without them. Since we had a list of the students who hadn't registered in the first four weeks, it would be possible to determine whether these students had passed the course or not. At the end of the semester we were able to compare the performance, as measured by a final grade, for each student in the class to see if there was

any difference in grade performance between those who had, and who had not, registered for the course seat-license. Table 1 shows that information for courses in which not all students registered. The results raise as many questions as they answer. In courses A, B, and C students who hadn't registered their seat-license averaged lower grades than those that had. Courses D and E, courses with more upperclassmen, showed different results and students who didn't register their seat licenses averaged slightly higher grades.

Although many of us want to believe that textbook content, digital or otherwise, leads to success in course work, it would be a mistake to suggest that these numbers support that. There are too many other possible explanations. We need to consider the varying content in each course, the instructor's reliance on textbook material, and compensatory behaviors that upper class students may have learned when they couldn't afford to buy a textbook. There may even be an alternate explanation for a student not registering a seat license. If, for instance, a friend downloaded PDF files for all the chapters and shared them with a student who hadn't registered.

Another possible explanation would be that some of these students, either, planned to drop the course or hadn't attended in the first place. In this spirit we wondered whether we might be able to use textbook registration as an indicator to identify students who might need an early intervention or help with the add/drop process. Alternatively, we can't dismiss the possibility that some students have learned that they can pass a course without textbooks. If, for instance a student has managed to get through his freshman year without needing to buy a textbook then perhaps he or she won't see the necessity of the textbook at any price. Even if, as we believed, freely available textbooks would lead to better grades and higher student retention this didn't

mean that students would buy into this premise.

Course	Standing	Course GPA w/ textbook	Student who Registered	Course GPA no textbook	Students Not Registered
Course A	Freshman	2.178	218	1.556	18
Course B	Freshmen	2.207	144	1.756	41
Course C	So/Jr/Sr	2.678	145	2.2	25
Course D	Sophomore	3.036	29	3.1	10
Course E	Jr/Sr	3.263	56	3.4	5

*Table 1: FWK Seat License Registration by Course Fall 2010*

### **New Product Adoption**

Our original assumption, that adoption would be more rapid and at a higher percentage, was based on the premise that affordability was the primary reason students didn't have textbooks. In retrospect this was a naive assumption. More than that, we needed to consider that we were not simply handing out free textbooks. We might have expected a higher adoption rate if digital textbooks were substantively and functionally identical to a traditional textbook, but they are not. We were asking students to adopt a new product.

On a conceptual level a paper bound textbook and a digital textbook have the same purpose; to deliver essential, authoritative, and centralized course content. We needed to take into account the fact that they do this in substantively different ways. First of all, even with the dramatic increase in the acceptance of e-books that can be read on computers, tablets, smart phones, and e-readers, reading discreet 'books' in this way is a relatively new behavior. Just the choice on devices indicates a very different reading experience.



Second, these different devices allow for different file formats. These different formats vary in features and functionality. Students can go directly to a website and read the book there. This provides a complete experience with hyperlinks, embedded videos, and built-in notetaking capabilities, but it requires an Internet connection. PDF files offer single chapters with hyperlinks if you are using a device that is connected to the Internet. Mobi files are designed for use with Amazon's Kindle device and each file contains a complete textbook. Even though it isn't necessary to be online to read the textbook, some features require an Internet connection.

We must consider the learning curve necessary for students, not only to decide on which of the alternative methods to use, but to even be aware of these alternatives in the first place.

### **Download Behaviors**

In, both, Fall 2010 and Spring 2011, approximately 680 FWK seat licenses were distributed to students in nine pilot courses. During this time we were able to track the files students were downloading. This meant that we were able to measure downloads for PDF files, which were available for chapters in each of the FWK textbooks. We were also able to track downloads of Mobi files, used with Amazon Kindle's and the Amazon Kindle app, epub files, which could be used with apples iBook app as well as other standardized book reading applications, and MP3 files, available in a limited number of textbooks, providing podcasts of complete chapters and study guides.

Due to the consistent number of courses and an almost equal number of seat licenses distributed in each semester we are able to see some clear usage patterns emerging over the two semesters. In each of the semesters we measured the number of downloads at, both the midterm of the semester, and the end of the semester. Table 2 shows the download information during this

time. There was a relatively small 8.4% increase in downloads between Fall 2010 and Spring 2011. This, however, doesn't really tell the story. It is much more informative if we look at downloads of files in each specific format; starting with the PDF files.

PDFs have long been a standard file format for exchanging information. Almost all computers and other digital computing devices such as smart phones and tablets have software that will read PDF files. PDFs allow for content to be viewed from various devices without losing any of the formatting put place by the original author. PDFs are also the preferred format used by library databases when students and researchers download articles from sites such as ABI inform and Ebsco's Academic Source Complete. It was, therefore, not surprising that PDF downloads were overwhelmingly chosen by students as the preferred method of retrieving digital content available through their FWK seat license.

In the fall of 2010 CSU students downloaded 2451 PDF files; representing 2451 chapters in various FWK textbooks. Although this number might seem high, it is relatively small considering that each textbook has an average of 16 chapters. Seen in this light, this represents only approximately 150 full textbooks. Of course, students chose to selectively download chapters. The download of PDF files was particularly brisk in courses where the instructor asked students to submit chapter summaries of the material.

In Fall 2010 slightly less than half of the PDF files downloaded had been downloaded prior to midterms. So why were more than half of the 2451 PDF files downloaded after midterms? One reason might be that students, having received their midterm grades, realized that the textbook might be helpful. Another could be that awareness of the FWK seat-license was starting to make its way to the students.

<b>Media</b>	<b>Midterm F10</b>	<b>Midterm S11</b>	<b>% increase</b>
<b>PDF</b>	1208	1810	49.83%
<b>MOBI</b>	59	271	359.32%
<b>ePub</b>	110	252	129.09%
<b>MP3</b>	142	187	31.69%
<b>Total</b>	<b>1519</b>	<b>2520</b>	<b>65.90%</b>
<b>Media</b>	<b>Mid-End F10</b>	<b>Mid-End S11</b>	<b>% increase</b>
<b>PDF</b>	1243	618	-50.28%
<b>MOBI</b>	67	18	-73.13%
<b>ePub</b>	63	33	-47.62%
<b>MP3</b>	83	36	-56.63%
<b>Total</b>	<b>1456</b>	<b>705</b>	<b>-51.58%</b>
<b>Media</b>	<b>TTI F10</b>	<b>TTL S11</b>	<b>% increase</b>
<b>PDF</b>	2451	2428	-0.94%
<b>MOBI</b>	126	289	129.37%
<b>ePub</b>	173	285	64.74%
<b>MP3</b>	225	223	-0.89%
<b>Total</b>	<b>2975</b>	<b>3225</b>	<b>8.40%</b>

*Table 2: FWK File Downloads by Format Fall 2010 and Spring 2011*

This latter explanation could be reinforced by looking at Spring 2011 adoption patterns. Here we can note an almost 50% increase in PDF downloads by the midpoint of the semester and a slight decrease in total PDF downloads by the end of the semester. This trend suggests that, while students aren't necessarily downloading more PDF files, they are downloading them earlier in the semester.

While total PDF numbers were flat over the two semesters, the usage of epub and MOBI files grew significantly, not only in the first half of the semester, but in total numbers. It is also important to understand that, even though the number of ePub and Mobi file downloads seems much smaller than that of PDF files, epub and MOBI files each contain an entire textbook, while PDF files, contain individual textbook chapters. Therefore, a student downloading one MOBI

file has retrieved as much digital content as a student who has downloaded 16 PDF files from the same textbook.

MOBI files are indigenous to Amazon's popular kindle e-reader. They can also be used on any computer tablet or smart phone with a Kindle e-reader application. By the midterm point in the fall of 2010 only 59 Mobi files had been downloaded. By the end of 2010, that number rose to 126 MOBI files. In the spring of 2011 students had downloaded 271 MOBI files in the first half of the semester; which represented a 359% increase in Mobi file downloads over the same period the previous fall. This number would level off in second half of the spring semester bringing the total of Moby downloads to 289 and representing a 129% increase in Mobi downloads.

EPub files were also downloaded at a much higher rate in the spring semester. By the midterm mark students had downloaded 250 ePub files; which marked a 129% increase. This number also leveled off, but by the end of the spring semester ePub downloads showed a total increase of 65%. Self-reported student behavior suggests that student awareness of various methods by which they could access their FWK digital content increased over time and with experience using flat world materials. In the survey taken at the end of the fall semester fully 90% of the students had gone online to the flat world knowledge website to read their course material. In that same semester only 8% of students responding had reported downloading a Moby or M.D. pub file. 24% had downloaded an MP3 audio file. (Feldstein, Hudson, and Warren 2011)

At the end of the spring 2011 semester 90% of students again reported accessing their flat world digital content through the flat world website but now 23% reported downloading Mobi or

ePub files. The download of PDF files remained constant at 29% in both semesters. We also looked at the data from the spring semester to compare the behaviors of students who reported having used flat world knowledge digital content in the fall semester versus those who had not.

Here we see differences as well. The percentage of first-time users who read the material online is slightly higher, at 93%, then the percentage (87%) for those students who had a flat world knowledge textbook in the fall. PDF downloads were almost identical for the two groups but, 28% of veteran flat world users downloaded mobile or eat pub files versus 18% of new users. While this differential is noteworthy, is equally noteworthy that even first-time users in the spring semester reported downloading Mobi and ePub files more frequently than first-time users in the fall of 2010.

### **Implications and Generalizations**

It can be exciting and eye-opening for faculty to gain new insights about student behaviors. In the context of this study, we were able to learn which students registered for their FWK seat-license and the types of files that students downloaded. While it is certainly important to be aware of these behaviors, it is also important to place this understanding in context. We do not have enough evidence to claim that these behaviors represent anything more than registering and downloading. We certainly cannot know whether they are reading the digital content since we cannot even know whether they are even opening the file.

We also cannot make a direct connection to traditional textbooks. The registration and download behaviors we tracked made it clear that digital textbooks are substantively different from their paper bound progenitors. As these digital textbooks develop I'm certain that we will

be able to track more behaviors. The metrics that are artifacts of a Web 2.0 experience allow us will continue to provide us with information. We need to exercise caution as we interpret and create strategies based on that information.

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