

BEYOND TEXTBOOKS

YEAR ONE REPORT



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Dr. Patricia Wright with students at Rich Acres Elementary School, Henry County, Virginia.

FOREWORD

The *Beyond Textbooks* pilot has demonstrated that multipurpose portable devices can be powerful learning tools when loaded with engaging high-quality applications. This report outlines the results of the pilot project and shows how these types of tools can be integrated effectively into schools. *Beyond Textbooks*, though, is much richer than just a test of new technologies and instructional media in classrooms. It also has demonstrated how public and private partnerships can accomplish groundbreaking work on behalf of students.

A contribution of \$150,000 from the Governor's Productivity Investment Fund was used to purchase iPads for students. In addition, private sector partners provided all the content, supporting resources, professional development, and technical assistance at no cost to the Commonwealth of Virginia. Finally, Dr. Matt Dunleavy at Radford University led the evaluation team. Together, we have advanced our understanding of how to design, produce, and use cutting-edge technology and instructional content in schools.

Patricia I. Wright

Patricia I. Wright, Ed.D.

Superintendent of Public Instruction



INTRODUCTION

"I look forward to a day when we need no paper or books, and I hope this guides us that way." –Beyond Textbooks high school teacher

In November 2009, the Virginia Department of Education launched a project to explore the implications of introducing traditional textbook alternatives into classrooms. In the 18 months since the launch, *Beyond Textbooks* has scrutinized cost-effective models that blend the vetted standards-based content and convenience of traditional textbooks with the engaging, dynamic, up-to-date content and resources afforded by the Web. Specifically, the Department of Education has uncovered new ways to access, organize, and deliver high-quality content using various platforms and tools (e.g., e-readers, multipurpose portable computing devices) and to understand the conditions necessary for successful implementation in schools.

The goals of the pilot project have been to understand:

- How digital instructional materials can be used most effectively to increase student engagement and educational outcomes and to improve teacher practice
- The conditions necessary for delivering high-quality instructional materials for a lower investment
- The technical, social, and policy implications of replacing traditional textbooks with digital alternatives

The Superintendent of Public Instruction invited textbook publishers and other instructional-content providers, technology companies, and interested parties to submit resources at no cost. Companies shared their ideas during a meeting in Richmond, and the Department of Education selected participants based on how well these strategies aligned with agency priorities. Of particular interest were the publications and supporting resources in the *2009 Recommended History and Social Science Textbook and Instructional Materials* approved by the Virginia Board of Education. Companies selected to participate in Phase I of the pilot included Adobe, Apple, Five Ponds Press, Inkling, MashON, McGraw-Hill, Pearson, and Victory Productions. See Appendix A for more information about the participating companies.

This effort was made possible by a \$150,000 grant from the Governor's Productivity Investment Fund (PIF), which was used to acquire iPads for students. The PIF partners with Virginia agencies to identify, catalyze, and implement innovative solutions that generate a more efficient and cost-effective government for the benefit of the Commonwealth's citizens.

This report shares findings from Phase I of the pilot project. Fifteen classrooms—representing four school divisions—participated in the pilot. Using a design-based research approach, evaluators collected data through formal and informal interviews, direct observations, Web site posts, and e-mail messages.



EARLIER STUDIES

From the beginning, *Beyond Textbooks* was grounded in a solid research base on the use of digital learning tools and, more specifically, portable computing devices (e.g., e-readers, iPods, iPads) in classrooms. Due to the nascent form of this technology, few studies on the topic date more than 10 years old (Simon, 2001; Wilson, 2003; Huang, 2003; Maynard & Cheyne, 2005).

During the initial planning of *Beyond Textbooks*, these earlier studies offered encouragement from a student engagement standpoint. Most students at all grade levels showed an increased interest in learning when using mobile learning devices; yet, the studies also offer words of caution—for one, all students and teachers do not have the same technological abilities. Mobile technologies will not become standard classroom components until all users—teachers and students—become more familiar with these tools. In addition, a divide remains between the established familiarity of traditional printed material and the unfolding innovations of progressive digital material (Jones, 2007; Abbott & Kelly, 2004; Hernon, Hopper, Leach, Saunders, & Zhang, 2007; Weber & Cavanaugh, 2006; Moyle, 2010; Princeton, 2009; Abilene Christian, 2009; Morelock, 2010; Patterson, Stokes-Bennett, Siemens, & Nahachewsky, 2010; McKnight & Fitton, 2010; Davy, 2007).

The research also suggests that whether the intended goal is to raise test scores or increase a child's interest, multimedia material can support learners at all levels. Due to the current digital-based culture, today's generation of K-12 students is more likely to engage in classrooms that utilize technology relevant to their lives. Since we live in a rapidly progressing digital world, our society must keep pace with this dynamic evolution to be able to function effectively. Likewise, mobile electronic devices need to be integrated into our classrooms if education hopes to keep pace with the world at large (Lewin, 2009; Cooper, 2005; Lenhart, Purcell, Smith, & Zickuhr, 2010; Berk, 2010; Leigh, 2010).



MATERIALS

Although multiple devices, including the Kindle, were considered for this pilot, the Apple iPad was eventually selected for use in all pilot sites. This decision was driven by the capabilities of the iPad coupled with a high level of interest in this device by participating schools and content providers. The iPad was not available until April 2010; consequently, this decision presented opportunities and challenges. On one hand, content partners were eager to develop content for the iPad through an iterative design process; on the other hand, nearly all digital content on the approved list of textbooks was developed using Adobe Flash, which is not supported by the iPad. This required content providers to reconsider their approaches to content development due to the time constraints of the pilot—the content had to be developed, tested, and ready to deploy in classrooms by early October 2010.

Two key points emerged from the planning stage: (1) the project would be limited in the amount of content provided for the pilot (e.g., Pearson developed six chapters for each text, Victory Productions focused exclusively on early Jamestown), and (2) development decisions must be considered from three perspectives—book as an app, an ePub, and a browser-based Web site. Victory Productions considered creating a digital version of the early Jamestown chapter using Apple's Keynote but abandoned the idea after discovering that the iPad version of Keynote did not include the same robust feature set as the desktop version. Specifically, it did not permit programmers to include internal links and buttons. Instead, Victory Productions embraced the Adobe digital publishing platform, which also presented challenges. These development tools were so new that they had not been released even for beta testing; however, Adobe made them available to Victory Productions for this project.

In addition, other challenges were not anticipated at the outset. For example, there were significant discussions about how to move from a print textbook designed for two-page spreads to the new form factor presented by the iPad. This debate was not as simple as using the same assets (in their digital forms) to reconstruct each page on the iPad and adding additional rich media assets such as video. Page navigation, in particular, was a major area of focus. After the initial release of the Jamestown app, a decision was made to include an opening screen that explains how to navigate through the chapter. Subsequent updates also addressed navigation challenges.

World History I and U.S. History II

Students in Pulaski, Newport News, and Arlington used instructional materials developed by Pearson. For middle schools, the content was based on the Virginia edition of *America: History of Our Nation: 1865 to the Present*, chapters 17-22. High schools used the Virginia edition of *World History: Volume I*, chapters 7-12. The Pearson project extended from November 2010 to March 2011 and included two versions of the text—Pearson Active-book and Pearson eText on iPad—along with supporting apps. Active-book, which is a browser-based text, was introduced first because it could be ready for implementation in classrooms more quickly. eText on iPad followed later in the pilot. It is important to note that the findings reflect teacher and student use of both solutions—the temporary solution (Active-book) and the eText on iPad. The Pearson solution was designed to engage students, help them master core content, and personalize learning. The engagement app provides gaming activities connected to Virginia’s Essential Questions. The assessment app provides quick study and vocabulary review and uses questions based on Standards of Learning (SOL) test data. The app scores student performance and offers a personalized recommendation for extension or review.

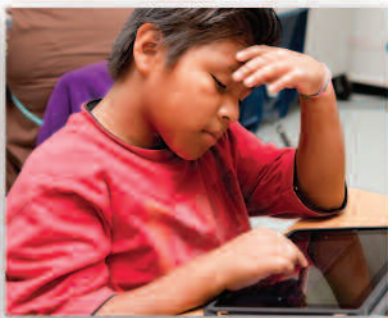
Jamestown

Students in Henry and Arlington counties studied Jamestown through an engaging media-rich presentation built by Victory Productions for the iPad. It uses Adobe’s new digital publishing solution that expands the traditional print layout and design capabilities of Adobe InDesign. Like Pearson, Victory Productions used a resource that was at the time on the Virginia Board of Education’s approved textbook list—Five Ponds Press’s *Our Virginia: Past & Present*. The Early Jamestown app garnered attention when it was discovered that the Five Ponds Press textbook contained several factual errors. As the publisher considered strategies to address these issues, the Victory Productions app was reviewed, changes were made to the text, and the app was immediately updated—an expeditious remedy that was not possible with the print version.

During this phase, development began on another Jamestown-related project. When this effort is completed, students will be able to use a robust content-creation and delivery platform developed by MashON to access digital assets—narrative, video, audio, images, etc.—and create projects (e.g., graphic novels, comic books) that demonstrate their content comprehension. They will be able to upload their own digital assets or access a digital library provided by the Jamestown-Yorktown Foundation featuring approximately 2,000 images and other assets from Jamestown Settlement. The platform will also feature a suite of tools that helps teachers design, manage, and share lessons. This project will be tested with students in fall 2011.

Advanced Placement Biology

Although *Beyond Textbooks* has focused primarily on social studies thus far, it also has included the Virtual Virginia Advanced Placement Biology course. As part of this effort, the students can use the Inkling e-reader to study a McGraw-Hill Raven Biology textbook. The rich, interactive, learning content combines text with embedded video, interactive assessments, high-resolution media, and social note sharing.



RESEARCH QUESTIONS

This report addresses two primary research questions:

RQ1. How do students describe and comprehend the ways in which **using the e-book modules aid or hinder their understanding of events or concepts?** How do they think and feel about learning in this way? What about these modules do they name as being helpful to their learning? What do they find to be challenging?

RQ2. How do teachers describe and comprehend the ways in which **using the e-book modules aid or hinder their teaching of the content?** How do they think and feel about teaching in this way? What about these modules/apps do they name as being helpful to their teaching? What do they find to be challenging?



METHODS

Participants

The participants in this study were students and teachers in two elementary schools (fourth and fifth grade) and three high schools in the Commonwealth of Virginia. The study also included Advanced Placement biology students from Virtual Virginia, the state's online school. Evaluators identified these schools based on their current use of Pearson and Five Ponds Press content, as well as through convenience sampling (willingness to participate). Over a period of two months, the evaluation team collected data from 12 teachers and approximately 20 elementary and high school students.

Data Collection

Two evaluators collected data for approximately 30 hours over a two-month period (see Table 1). They conducted interviews with or sent e-mail questionnaires to 12 of the 15 participating teachers and a sample of students from two of the five sites; most interviews were videotaped while the evaluators took notes. The evaluators observed teachers as schedules permitted, but, due to scheduling conflicts, not all teachers were directly observed; in these cases, teacher information was gathered via e-mail and/or phone consultation. Data collection instruments are presented in Appendix B.

Table 1. Data collection procedures

Procedure	Number	Total Time
Observations	12	12 hours
Formal interviews	15	15 hours
Informal interviews	5+	3 hours
E-mail questionnaires	10	N/A
Total	42+	30 hours

Data Analysis: Cross-Site Data Analysis

The individual case studies were used for the cross-case analysis. The evaluators used pattern-matching analysis—where the cases served as comparative contexts for one another—to determine if students and teachers had capitalized on the unique offerings of the iPad and associated e-book products or whether these products had limited the learning process in any way.



RESULTS

RQ1. How do students describe and comprehend the ways in which **using the e-book modules aid or hinder their understanding of events or concepts?** How do they think and feel about learning in this way? What about these modules do they name as being helpful to their learning? What do they find to be challenging?

Based on the student interviews and classroom observations, most students clearly liked the e-book's ability to **support individualized learning**. The vast majority of students reported that they felt **comfortable reading and using an e-book**. Interactive e-books **increased student engagement**, as evidenced by the students' words and the observations of teachers and researchers. Most of the issues that challenged students were technical in nature—as noted in the section regarding *Conclusions and Implications*. One of the most interesting findings is how readily students envisioned and championed the use of the same technology for other subject areas. Although most students in the pilot used social studies content, they saw capabilities embedded in interactive e-books that could enhance learning in other topics.

Using e-Books to Support Individualized Learning

Students appreciated being able to work at their own paces, whether in small groups or independently. Internet connectivity was an important tool for students, allowing them to get quick answers to questions prompted by their reading. However, in some schools, students were not allowed to take the e-book home or did not have Internet access at home; this negatively affected these students' ability to maximize the tool's capacity. While students embraced the opportunity for individualized learning, some needed additional support to use the device and various apps.



Figure 1: A high school student combines an iPad with a paper-based activity.

We can actually go at our own pace (high school student).



Figure 2: A high school student focuses on an iPad task.

When you're doing work with a textbook, you just have the information it gives you. When you're reading an iPad, you can close out of that and go to the Internet and Google something you don't understand. . . It can get you more in depth with what you want to learn (high school student).

It's cool that in the middle of the lecture—like, if I find a cool fact that I wanna go more into—I could . . . without interrupting him or asking him to end the lecture, I [could] find out more information about it and not interrupt the whole class (high school student).

We can't bring it home with us, so it doesn't really sink in that much. All you can do is little timed activities; they don't impact our learning that much (high school student).

When we first used it, most people didn't know what an iPad was, so we spent at least one week learning about it and how to use it. They gave us a heads up of when we were gonna

use it, but when we got to it, everybody was like, "Whoa, wow," and when we got to the apps, there were so many apps they didn't know what each app was or what each app meant (4th-grade student).

Reading e-Books Instead of Textbooks

The vast majority of students reported being enthusiastic about reading and using e-books since they are already comfortable with this activity. Some felt it saved class time because the teachers did not have to spend time passing out textbooks. However, some students reported difficulties with the e-books and expressed a desire to continue using paper textbooks. Others were frustrated by the slow download times, which made using a printed textbook more convenient by comparison.



Figure 3: A student uses the iPad keyboard to type in a specific page number in a textbook.



Figure 4: Students explore the Jamestown content.

We're learning more because our generation is into technology, so it's a better grasp for us than just staring at a textbook all day. We can switch back and forth, and it's comfortable (high school student).

I'm more used to reading on computers, so I guess I'm more focused on that. . . . I [am] more focused on the iPad than reading out of a textbook (high school student).

The textbook is really into your iPad, so it's like you're using a textbook, but you're not really . . . flipping pages, looking through it. So, it's just helping you get to the exact page that you want, and it shows you video clips (4th-grade student).

Everything goes faster. We don't have to go in our cubbies and get these heavy old textbooks (4th-grade student).

I think learning with the textbooks is easier; it helps me concentrate more. . . . I can't focus with [the iPad]. You're always touching it. When you read, you can just settle down and have the book there (high school student).

I honestly prefer the textbook because I can't always get the iPad to respond to me, and it's just easier to flip back and forth—the pages (high school student).



Figure 5: Students assist one another with an iPad activity.

It's worth it as kind of a side tool; I don't think it would be the greatest idea to replace books completely with [the iPad] because I still like to write notes down so I have them. And I'm not the fastest typer, so I can't really use that a lot (high school student).



Figure 6: A teacher clarifies the assignment.

Increased Engagement in Learning

Students credited the interactivity of the e-book as the reason for their increased engagement with the material. Interviewers found that students expressed a willingness to take more responsibility for their learning, perhaps because of the increased control they felt. Many students also felt the instant feedback in the games and quizzes was helpful in remembering content. Students also supplied feedback on how the new e-books could benefit them in other subject areas.

It keeps me interested. If we just had the book, I would pay attention but not as much because it is just a book. There is nothing coming to life like . . . pow . . . like look at me. But this [iPad] . . . I have something to look at (student interview).

I like having fun. . . . Using these iPads just widens out your variety of learning. . . . You are doing it in more ways—not just reading. . . . You are having fun while you are learning (student interview).

It's a different approach, which I think is a plus because I don't really like the whole old style where they just drill the information into your head (high school student).

When I read the textbook, I just read it and then I just kinda keep it in my mind until the quiz, and then, for some reason, it just goes out. Certain activities for the apps and stuff, like the games, they help us remember it (high school student).

They give you really key points and tell you really important things, and it gives you ways of memorizing. It keeps reviewing, and review is always the best way to learn (high school student).

I think the Pearson apps are really helpful . . . because they give us different viewpoints or insights into the same thing (high school student).

There should be an app where, for science, you have one color of liquid and another, pour it together, and see what it creates (4th-grade student).



Figure 7: A fourth-grade student studies the Jamestown timeline.

RQ2. How do teachers describe and comprehend the ways in which **using the e-book modules aid or hinder their teaching of the content?** How do they think and feel about teaching in this way? What about these modules/apps do they name as being helpful to their teaching? What do they find to be challenging?

Teacher findings relied on feedback from the teachers and observations by the researchers and the local instructional technology resource teacher (ITRT)—a specialist who provides technical and pedagogical support for teachers. Teachers cited two important advantages to the e-book: **student independence** and **student collaboration**. The e-book features allowed some teachers to become **facilitators of learning** rather than deliverers of facts, while it frustrated others who preferred to focus specifically on teaching content. Teachers noted that the interactive features of the e-book **increased student engagement**. Many of the issues that challenged teachers were technical or policy based (see *Conclusions and Implications* section); although, teachers did identify two challenging content issues based on **expectations**. Teachers expected the e-books to cover the applicable Standards of Learning completely but were unsure that they did; they also expected more depth of learning in the e-books themselves—a unique expectation with e-books that is not necessarily true with print versions.

Increasing Student Independence and Student Collaboration

Many teachers noted a dramatic increase in the students' independence and willingness to be responsible for learning on their own. At the same time, the tools allowed opportunities for students to collaborate and work together while developing social skills that were not supported by regular textbook use.

[The students] felt incredibly independent, and to be able to take ownership over your own learning is very important, especially at this age. . . . They don't have to get to a point and stop and wait for me to give them further instructions. They can keep exploring (4th grade teacher).



Figure 8: A high school student focuses on an iPad task.

The best part was having access at anytime to the Internet. For example, if a student pops up with a random question that no one knows the answer to, they can find it quickly and share it with the class. Typically, we would have to sign up for a computer lab for the student to have access to the Internet (high school teacher).

The iPad itself has proved to be an invaluable tool for instant access to items for research (high school teacher).

The iPad makes problem solving much faster and more convenient. Students are able to look things up right away if they have questions (high school teacher).

The kids interact a lot easier and . . . to my surprise, they've been a lot more willing to help each other out. . . . That has increased their vocabulary—or, I guess, their communication with one another (ITRT).



Figure 9: A teacher facilitates collaboration.

Teachers as Facilitators of Learning

The technical capabilities of the e-book, including its ease of use compared to other technologies, allowed teachers to become facilitators of learning. They had more time available to differentiate learning with the tools, interact with students individually or in small groups, and move around the classroom freely. The ability to facilitate learning, rather than recite or direct from the front of the room, provided some teachers a new vision of teaching. This highlights the need for professional development that focuses on pedagogy in the specific context of using the e-book device.

Mr. Smith. . . has done a combination of everything; he's done single or individualized instruction; he's done group; he uses a lot of his SMART Board to project—like he'll have questions up and have the kids answer the questions on their iPad using the Adobe Ideas (ITRT).

The iPad is so user friendly that students can operate them almost as easily as opening a book and reading (high school teacher).

It gives mobility to my teacher. . . . It's great to have the iPad in front of us and be able to reach all the kids (ITRT).

One thing we've had to work on is streamlining what they learn because the pages move and the kids can do their own stuff (you can see a kid easily change the page); you can say, "Go to the Jamestown timeline," and the kid may be on something else. So . . . it's been a little different trying to make sure the kids stay focused (ITRT).



Figure 10: Students and teachers work together.



Figure 11: A student explores another portion of the Jamestown app.

Increasing Student Engagement in Learning

Teachers noted that the e-books encourage more engagement to learn the material. Several teachers also reported that students with special needs seemed to experience enhanced learning as a result of using the e-books. The students associated having “fun” with learning, which fosters continued learning.

Some of our special ed kids have actually equipped themselves faster in processing on the iPad versus a regular book (ITRT).

My students are much more engaged with the eText (middle school teacher).

The kids are enjoying it a whole lot more than they would having an actual textbook in front of them. . . . I know the few times they’ve left them at home and . . . had to use the book, they don’t seem to pay attention as much (4th-grade teacher).



Figure 12: A fourth-grade student watches a Jamestown video.

Teacher Expectations of e-Books

Since teachers had not used e-books before, they had envisioned certain characteristics that seemed to be lacking, especially in the earliest versions of the materials. Foremost, teachers wanted assurance that the materials would address all Virginia standards that applied to the content. Most felt that the e-books accomplished this, but others had specific concerns. Additionally, several teachers were looking for more

interactivity and hyperlinked in-depth material for student exploration. Some teachers also expressed concerns about what they perceived as device limitations (e.g, lack of support for Adobe Flash, inability to project from the iPad) and challenges with Internet connectivity.

The online textbook does meet many of the SOL requirements as far as content is concerned (high school teacher).

The apps need to be more directly connected with the content. For example, the primary sources would be better if they were mostly from key people (such as the ones from Joan of Arc and Pope Urban II) from the SOL instead of others from the period. They are good but not directly connected to what the students must know for the state standards. I feel they will be used for review, and if the students are learning items that are not part of the core

content, then they are over-learning the subject and not preparing effectively for the test. The test review (vocabulary and test practice) would be better if it was more closely aligned with the SOL-mandated content (high school teacher).

The kids really enjoy the Pearson games—they think they are fun. However, sometimes I fear that the games are not focused enough on the Virginia SOL standards. I would like to see more games that are especially aligned with the standards (high school teacher).

I have a little bit of an issue with the book itself. It gives you what you need to know for the test, but it does not expand on anything. It is kind of like, "Here is what you need to know, and we are done with that" (4th-grade teacher).

[Five Ponds Press] doesn't give you reason why for a lot of things. One of the things we were looking at today said something about "Christopher Newport continued on exploring" and my kids were like, "What was he doing? What was he exploring? What were the other colonists doing while he was gone?" It does not seem to give you anything extra (4th-grade teacher).

If it had Adobe Flash, I would say pretty much this would be 100% the device to use. It's still great with the apps, but Adobe Flash for current education use is a hiccup because of the Web sites (ITRT).

One thing we've been working on is projecting the information. . . . Because it can't project out, we have to use a document camera or something like that (ITRT).

Each time we have attempted to use iPads, a student or multiple students have had difficulty connecting to the wireless Internet. At times, a student will spend up to 30 minutes struggling with this. We have even reassigned another iPad to the student, and they will continue to struggle. This really frustrates the student(s) and makes them feel like they are falling behind classmates on the activity (high school teacher).

I faced a problem with Internet connectivity. This was hard because some students could open pages while other students had to wait for it to load. This was hard to keep the class on the same pace (high school teacher).

Conclusions and Implications

Although the focus and duration of the study were limited, Virginia's pilot use of e-books for learning provides useful insights for educators and publishers. The two primary research questions address how students and teachers perceived the utility of e-books as learning devices. As seen in the discussions related to both questions, increased student independence and increased engagement were noted by students and teachers. Additionally, the students' comfort levels with the e-books allowed teachers more freedom to become facilitators of learning.

The research questions directly addressed our first project goal: to understand how digital instructional materials can be used most effectively to increase student engagement and educational outcomes and to improve teacher practice. However, the other two project goals were also informed by the observations, interviews, and the process used in the pilot.

A second project goal was to understand the conditions necessary for delivering high-quality instructional materials at a lower cost. The most pertinent finding related to continuous user feedback for publishers, which were developing completely new types of products and working with new and, at times, untested technologies. Their willingness to adjust the products based on the teachers' and students' concerns showed how important it is for real-life learning situations to be included in product development at an early stage. Publishers also benefited from having some of their early attempts validated, which allowed them to focus on other aspects of the product development. While calculating actual cost savings was beyond the scope of this study, it is reasonable to conclude that the process resulted in more comprehensive products that decreased the need for supplemental materials.

Content partners developed apps based on existing content, as determined by pacing guides used in the participating divisions. Consequently, the early attempts (e.g., Active-book) reflected a more traditional approach to delivering digital textbooks. As teachers began to use these prototypes in classrooms, their feedback ensured that the content, functionality, and interfaces reflected student and teacher needs and preferences. Evaluators met frequently with teachers to seek feedback on the apps' usability and to provide the content partners with requests for additional features. For example, the initial e-book format was expanded to include new features (e.g., bookmarking, highlighting, searching) as requested by teachers and students. The large volume of feedback for the first release stood in stark contrast to subsequent releases, illustrating the value of an iterative design and development process. The feedback enabled content providers to make refinements early in the process and avoid significant investments of time and financial resources on features that were not viewed as being particularly useful. Despite the value of this approach, most companies engaged in new product development might not use this same process because it allows users to see "the good, the bad, and the ugly" of product development. On the other hand, those that embrace this process could benefit immensely.

To apply these findings to any future planning, it is important to consider the technical, social, and policy implications. With few exceptions, the technical issues are easier to address. For example, the second-generation iPad now permits projection from the device—a technical limitation that frustrated some participants. Policy and social issues, on the other hand, tend to lag behind the desire for innovation in the classroom.

Internet access was an important issue for many of the participants. This was due occasionally to unreliable infrastructures in the schools, such as the device's inability to maintain a network connection; in other instances, students did not have Internet access at home, which limited their ability to study during non-school hours. Additionally, provisions need to be made for when students forget their e-books at home or when new students transfer to a school. Internet access is essential to realize the full potential of this technology.

The issue of Internet access is not merely a technical consideration. Until universal access to high-speed Internet is available, some students will be at a disadvantage because they will not have access to the full functionality of e-books and similar tools. When considering e-books as students' primary instructional resources, the digital divide and knowledge divide are dramatically amplified.

Schools must develop policies that address the technical demands of the newest technologies. Cost is obviously a major factor. School divisions must determine the costs of these devices and subscriptions to e-books versus the savings accrued from not purchasing multiple printed textbooks. Mobile 24/7 access to the Internet must be accounted for in acceptable use policies. Policies that ensure equitable access to the tools and Internet access should also be developed.

Finally, many teachers tend to use new technologies to support their current teaching methods; however, they need to learn new pedagogical approaches to support these technologies—in this case, interactive e-books. These strategies must be based in research, tested in practical situations, and supportive of new types of learning. While teachers and students really like e-books, technical limitations and pedagogy (through professional development geared specifically to these new technologies) must be addressed.

This report represents a snapshot in time and is not intended to be a final report on the initiative. Instead, it communicates preliminary findings that hopefully will be beneficial to content providers, policy makers, and educators in developing and deploying innovative e-book solutions.



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APPENDIX A:

Participating Companies

Participating Companies

Adobe

www.adobe.com

Apple

www.apple.com

Five Ponds Press

www.fivepondspress.com

Inkling

www.inkling.com

MashON

www.mashon.com

McGraw-Hill Education

<http://www.mheducation.com>

Pearson

<http://www.pearson.com>

Victory Productions

www.victoryprd.com



APPENDIX B:

Data Collection Instruments

Teacher Interview Questions

Date_____Time_____Site_____

Interviewee_____

Interviewer(s)_____

Thank you for meeting with us. We have some questions to ask about your classroom innovation and use of e-books in your teaching. These questions are part of a Virginia Department of Education research project looking at how e-books affect classroom practices.

What you tell us will be anonymous and remain confidential. We hope you'll feel free to be very candid in your responses. We have a video camera running for accuracy and completeness. We will not identify individual names with comments in any of our reports.

At beginning of video recording, state the date, time, site, interviewee, and interviewer(s).

Research Questions	Interview Questions
Use 4	<p>What is your general impression of the project?</p> <p>What are all the ways you use the e-book learning modules in your classroom (Probe for elaboration on each and how frequently)?</p> <p>Can you give me an example of how the modules have led to a success in or solved problems for learning (Probe: engagement, ongoing assessment, interdisciplinary opportunities, alignment with standards, etc; differentiate between iPad and the module)?</p> <p>Can you give me examples of how the e-book learning modules have created challenges or problems for your teaching (Probe: e.g., alignment with standards, etc; differentiate between iPad and the module; differentiate among hardware, software, infrastructure, managerial, and instructional)?</p>

Research Questions	Interview Questions
Use 5, 6, 7	<p>Have you noticed any changes in your teaching during the project? (Probe for relationship to project goals and criteria for success—didactic, coaching, constructivist pedagogy. Probe for unique opportunities and challenges related to the teacher’s role in using e-books in the classroom. Probe for changes in interactions with and among students.)</p> <p>How, if at all, has the project changed your understanding of your teaching?</p> <p>How, if at all, has the project changed your understanding of the content? (Probe: Is the e-book form of content facilitating teacher mastery of content or confidence teaching content?)</p> <p>How would you describe the changes in student collaborations you’ve seen?</p> <p>Can you give an example of how your expectations of the students has changed?</p> <p>Have you noticed any differences in the way different groups relate to or interact with the iPads? (Probe: girls vs. boys, racial, socioeconomic, ESL, special education, gifted and talented, etc.)</p>
Support 8	<p>What, if any, prior experience did you have with iPads or similar devices?</p> <p>What technical and instructional technology support do you receive? (Probe for knowledge of personnel, protocol, work flow). What worked well and helped you to be successful in the project? What do you wish worked better? (Probe for hardware/software, leadership, communication, disruption in instruction.)</p>
Summary	<p>Based upon your experience, do you think iPads or similar devices could replace or supplement traditional textbooks? Please explain why or why not.</p> <p>Do you have any suggestions on how the program could be improved? (Probe: differences among programs, hardware, and software.)</p> <p>Do you have any questions for me? Is there anything you’d like to add that would help us better understand the project?</p>

Student Interview Questions

Date _____ Time _____ Site _____

Interviewee/Gender _____ (m/f)

Interviewer(s) _____

Thank you for agreeing to be part of this interview. We are going to ask you a few questions about your class and how you use iPads in your learning. These questions are part of a research project looking at how we can improve teaching and learning.

What you tell us will remain confidential. Individual names will never be reported. We have a video camera to help us keep track of all the different answers and help us analyze the data. If you decide at any time that you don't want to continue with this interview, just say so and you can return to your class.

At beginning of recording, state the date, time, site, interviewee, and interviewer(s).

Research Questions	Interview Questions
Use 1, 2	<ol style="list-style-type: none">1. Describe for me your overall impression of your experience with this project? (Probe for summative words—e.g., cool, frustrating, hard, stupid.)2. Do you think you learn more, better, or new things because of the iPads? Please give some examples. Have the iPads helped you do things you would not be able to do without them?3. How do you think learning in this way helps you understand social science/history?4. What are some of the things you don't like about learning using the iPads? (Probe issues like problems with the equipment or software, working with others/groups, students who don't like computers.) Can you think of any drawbacks or problems resulting from being in a class with this kind of learning?5. How is what you have been doing for this project different from what you normally do in class? (Probe for interactions with classmates; what he or she likes/dislikes—do they like history more because of the iPads/modules; changes in teaching, interactions with teachers and expectations that they notice.)6. How, if at all, is homework for this project different from what you normally do at home? (Probe issues like help/independence from parents, the way you communicate with the teacher/students/parents.)

Research Questions	Interview Questions
Use 3, 6	<p>7. Did your teacher do things differently because of the iPad? Please explain.</p> <p>8. How did you work with your fellow students while using the iPad? (Probe for changes in interactions.) What did you like best about working with your classmates? What did you like least?</p>
Use 2	<p>9. How interesting do you think social science/history is after learning in this way? Do you think social science/history/biology is more interesting when taught in this way? Why or why not?</p> <p>10. How do you think the new knowledge and skills you are learning in this class will better prepare you for the future (e.g., high school, work, life)?</p>
Summary	<p>11. Have you ever used an iPad or a similar device prior to this project? (Probe comparisons of program with prior iPad/app use.)</p> <p>12. If you could have your wish, what could be done to improve this program?</p> <p>13. Have we missed anything that you would like us to know about the project?</p>



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