

Making a Difference with Smart Tablets

Are iPads really beneficial for students with autism?



“There were no students whose comprehension decreased when using the iPad . . .”

AMY PRICE

They look so cool, those tablet devices with faster-than-lighting technology that provide access to just about any kind of information you can imagine.

As a librarian at Oakstone Academy, a school where students with autism are immersed in all academic and social activities with their typically-developing peers, I'm always on the lookout for tools that will help children with autism better access library materials. And as far as learning tools are concerned, these tablets offer a lot with their stunning visual and sound capabilities. My thought: Would iPads used as e-readers help increase comprehension among students who are significantly behind?

To explore this possibility, I approached the State Library of Ohio for a LSTA grant in the summer of 2010. I proposed conducting a small study that would measure the effectiveness of iPads (used as e-readers) with students who demonstrated significant deficits in reading comprehension (in our case, we selected students who were at least four grade levels behind). The specific questions we had for the study:

- Would students with autism show an increase in comprehension when using iPad interactive e-books?
- Could the iPad provide individuals with autism to overcome information access barriers—much in the same way that Braille provided access for the blind?

With the support of the grant, we purchased ten 64 GB Wi-Fi iPads equipped with durable Otterbox cases and interactive e-book apps.

UNDERSTANDING THE CHALLENGE

Individuals with autism have significantly impaired sensory input: They may *over* process sensory information or *under* process it. In either situation, the result is a deficiency. For example, an individual with autism may be so distracted by the over processing of the type of paper or the font that he can't concentrate on the letters, or he may have such poor visual processing that the letters get lost before they can be put together.

Unlike a person who is blind—and therefore lacking visual ability—individuals with autism typically have differences in all of their sensory systems. So, while audio books might be enormously helpful to a person who is visually impaired, the same audio book would not provide an autistic individual with the necessary additional sensory input. For this reason, tablet technology was selected because it provides multi-sensory output.

DEVELOPING A PLAN TO MEASURE RESULTS

Over the following year, data was taken on ten students in middle school grades 6-8, ten students in high school grades 9-12, and ten students over the age of 18 who were enrolled in state-mandated special education services for students ages 18-22. The data that was taken included results on four sets of comprehension questions. Each student was asked to read traditional printed book text and answer a set of comprehension questions twice. Then, each student was asked to read an interactive e-book and answer a set of comprehension questions twice. All interactive e-books in this study included full color pictures and simultaneous audio and text.

Because all of the participating students had a diagnosis of autism and were at least four grade levels behind in reading, we were sure to get a good look at students whose information access has been impacted by their disability.

OVERALL POSITIVE RESULTS

In our small sampling, every child with autism improved when using the iPad and interactive e-book over text books, except one. However, that student answered 100% of the comprehension questions correctly on all four assessments. There were no students whose comprehension decreased when using the iPad and interactive e-book. The rate of increase in comprehension when



JUNIOR NONFICTION

SPORTS PLAY!

Freestyle BMX (On the Radar: Sports). Isabel Thomas. Lerner, 2011. 978-0-7613-7764-1. \$19.95. Ebook edition available, \$14.96. Grades 4-8. Opening with the history of bicycle motorcross, this title explains to the reader how the added adventure of “freestyle” was born. Chapters are divided into sections, “The People,” “The Moves” and “The Talk.” A simple index and additional information round out the title.

Motocross (Racing Mania). Bryan Stealey. Marshall Cavendish Benchmark, 2010. 978-0-7614-4386-5. \$21.95. Grades 3-6. See incredible vehicles in this six-book series including the dirt bike motorcycles of motocross, considered by many to be the first “extreme sport.” Color photos, fact boxes, and interesting text make this a hit for sports fans. Back matter includes a glossary, index and further information.

Odd Ball: Hilarious, Unusual, & Bizarre Baseball Moments. Timothy Tocher. Marshall Cavendish, 2011. \$12.47. 978-0-7614-5813-5. Grades 3-6. The subtitle says it all with each chapter as an inning and moves quickly through weird baseball events. This quick and funny read will be appreciated by baseball fans and nonfans alike!

Soccer in South America. (Smart About Sports). Mike Kennedy. Norwood House Press, 2011. 978-1-59953-446-6. \$17.63. Grades K-3. Young readers will see a brief look at the soccer of South America as well as a glimpse of the culture. Other titles in the soccer series are about Asia, Central America, Eastern Europe, North America, British Isles, and Western Europe.

Tie these titles with the picture book **Goal!** by Mina Javaherbin, Candlewick Press, 2010, 978-0-7636-4571-7. \$16.99. Grades 2-4. Here is a story of children in South Africa who draw strength from their soccer friends as they defend themselves from bullies.

Results from the “Ease of Use” questionnaire were not as positive. While teachers found the iPad easy to charge, and students found the touch screen easy to navigate, organizing the apps and the iTunes store was frustrating for teachers.

using the iPad and interactive e-books was 21% in students in middle school grades, 25% in students in the high school grades, and 21% in students ages 18-22. All three groups showed statistically significant improvements in information acquisition when using the iPad, interactive e-books.

In addition, to provide greater insight into the feasibility of using iPad technology with this population, participating teachers were asked to complete several questionnaires, including “Student Interest” and “Ease of Use.” On the “Student Interest” questionnaire, teachers reported that students found the iPads motivating and that use of the iPad reduced off-task behavior. Some students would even choose the iPad as a reward for appropriate behavior. and there were no reports of students refusing to use the iPad or needing to have their iPad privileges revoked.

TROUBLESHOOTING

Results from the “Ease of Use” questionnaire were not as positive. While teachers found the iPad easy to charge, and students found the touch screen easy to navigate, organizing the apps and the iTunes store was frustrating for teachers. The only organizational strategy for apps that is provided with the iPad is folders, which proved inadequate for the number of interactive e-book apps that teachers wanted to load on each iPad.

In addition, most teachers are accustomed to searching books with full MARC records that provide reading level, interest level, and all the attributes of the book (books with many full page pictures are “picture books,” original versions of classics are identified, etc.). There is no such database for e-readers. To help teachers

access books using these parameters, I generated an excel spreadsheet to provide them with basic information about which apps had auto page turn, highlighted text, a “read to yourself” function, and chapter selection. However, this did not begin to satisfy the need for information when teachers selected materials for a particular student. Many of the interactive e-books that are available are classic tales that have been published at varying reading levels, from elementary to high school. It would be much more convenient when buying the app, as well as when using the app, if more detailed information was provided. For our purposes, we abandoned the idea of teachers buying and downloading the apps themselves and offered to provide the service through the library.

In addition, we found that turning to the iTunes store for assistance was difficult, as search capabilities are limited and disorganized. For example, descriptions must be opened individually in order to try to find information about highlighted text, an audio component, etc., and that information is not always listed in the small review presented with each app. Over the last few months, Apple has made some improvements, but each app needs a record that contains the content found in a MARC record, like those used for print books. Syncing was challenging also, due to the need to sync each iPad individually. The ten iPads in the study took about four hours to sync individually when new materials were purchased. However, this stumbling block would be easily solved with an iPad cart or the new iPad “cloud” configuration which was not yet available during our study.

Finally, the use of the voiceover feature to read text was abandoned quickly as well. The voiceover feature is activated in



Student using an Apple iPad

the settings category and must be used for all features of the iPad once it is activated. Therefore, once voiceover is activated, touching an app results in the iPad reading the name of the app, not opening it; a double touch must be used to open the app. Using a single-finger swipe is similar; a triple-finger swipe is needed to result in the same action. This was too confusing for both teachers and students. Abandoning the voiceover feature precluded us from using e-books checked out from local libraries. We were unable to find e-books in local libraries that were interactive and did not require the use of Adobe Flash Player, which is not yet compatible with the iPad. Despite these complications, all of the participating teachers said they found the benefit of the iPad worth the cost.

THE FINAL VERDICT

The results of this study show that the iPad is something that should be considered for



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JUNIOR FICTION

PROBLEMS TO SOLVE

Cinderella Smith. Stephanie Barden. HarperCollins, 2011. \$14.99. 978-0-061-96423-7. Grades 3-6. Cinderella Smith's always losing shoes, but now it's a major problem. If she can't find her missing tap shoe, she won't be able to be the Pumpkin Blossom Fairy at the fall recital, even though she got the part!

The cruisers. Walter Dean Myers. Scholastic Press, 2010. \$15.99. 978-0-439-91626-4. Grades 5-8. Zander and his friends, students at Harlem's Da Vinci Academy for the Gifted and Talented, are in trouble for low grades, so when the Civil War unit begins, they're ordered to redeem themselves by negotiating a peace – and war ensues!

Jake. Audrey Coulombis. Random House, 2010. \$15.99. 978-0-375-85630-3. Grades 3-6. After Jake's widowed mom falls and breaks her leg and ends up hospitalized, his long-out-of-touch paternal grandfather comes to care for Jake. Jake doesn't think Grandpa likes him and he dislikes Grandpa's dog. How can they all get acquainted?

A tale of Two Castles. Gail Carson Levine. HarperCollins, 2011. \$16.99. 978-0-061-22965-7. Grades 3-7. Twelve-year-old Elodie has always wanted to be an actress, but when no troupe wants her, she ends up helping a dragon named Meenore solve mysteries in Two Castles, including a plot against the town's shape-shifting ogre, Count Jonty Um.

The trouble with chickens. Doreen Cronin. Kevin Cornell. Balzer + Bray, 2011. \$14.99. 978-0-061-21532-2. Grades 3-7. J. J. Tully, a retired search-and-rescue dog, is bribed (with a cheeseburger) into helping a chicken family find their missing family members. How is their crazy neighbor, Vince the Funnel, involved?

This small study gives us some statistical evidence that the iPad is worth the investment for most students with autism.

schools, libraries, and professionals serving individuals with autism. However, one must keep in mind that no two individuals with autism are the same. The percent of increase in information acquisition when using the iPad was 0-50% in our study. While no student showed a decrease in information acquisition using the iPad and some students showed huge increases (up to 50%), some students did not show significant increases. Another important consideration is Wi-Fi availability. While the setting of the iPad—including the ability to purchase apps, make in-app purchases, and delete apps—can be password protected, the Wi-Fi feature can not. In our study, Wi-Fi was not readily available, so students could not turn it on and “surf the net,” instead of reading an interactive e-book. Our iPads also did not have movies or music loaded on them, which might be a tempting distraction for some students, if available. In addition, our iPads did not have 3G or 4G capabilities, which would make the Internet more accessible and have filtering implications for schools and libraries.

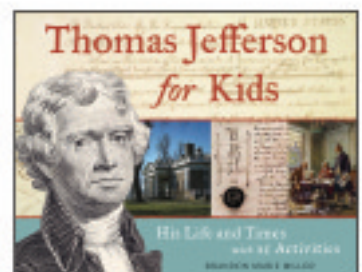
Another advantage of the iPad is the availability of communication apps for it. While we did not collect data on the use of communication apps, we were able to expand our grant to purchase and use several. Both staff and parents commented that the iPad and communication apps were superior to traditional communication devices in the areas of durability, cost, and appearance. More research is needed into new and emerging technologies to help professionals and parents understand what would be worth the investment for their students. This small study gives us some statistical evidence that the iPad is worth the investment for most students with autism. As libraries, parents, and professionals look to invest in adaptive equipment for individuals with autism, the iPad holds a lot of promise.

Amy Price serves as the librarian at Oakstone Academy, while she completes her Master of Library and Information Science degree at Kent State. Oakstone Academy, located in central Ohio, serves students with autism ages 12 months to 22 years in four buildings: a preschool/daycare, elementary school, intermediate school, and middle/high school. Founded by Dr. Rebecca Morrison in 1999, the school is based on the Social and Academic Immersion Model. This model features not only a classroom but a school-wide environment that fosters high expectations in behavior and academic achievement for all students.

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