When it comes to the digital environment that permeates younger and younger children’s lives today, we live in the age of the Jetsons. But when it comes to our understanding the impact of ubiquitous digital habits on children’s learning, our research enterprise is more like the Flintstones!

—Michael Levine, “The iTot Challenge: Getting Young Children Ready in the Jetsonian Age”

The AVG Digital Skills study (AVG Technologies 2011), commissioned by Internet security company AVG and released in October 2010, polled mothers of young children in 10 countries about their children’s life skills and technological skills. The surveys revealed that while most children ages 2 and 3 are not yet able to swim, tie their shoelaces, or make breakfast unaided, they do know how to turn a computer on and off and navigate with a mouse. In addition, 44 percent of 2- and 3-year-olds can play a basic online computer game, and one quarter can use a cell phone to make a call. The 2012 joint position statement on children and technology from NAEYC and the Fred Rogers Center for Early Learning and Children’s Media recognizes the role technology plays in the lives of many young children and families: “Children’s experiences with technology and interactive media are increasingly part of the context of their lives, which must be considered as part of the developmentally appropriate framework” (5).

Lisa Guernsey (2010) and the New America Founda-
ional contend that proper use of technology in the early childhood classroom is not only inevitable, but also vital to young children’s education:

Video technology can expose young children to landscapes, objects, animals, and phenomena they’ve never seen and that they may have a hard time grasping through abstract conversations. Downloadable digital books can provide children with more access to great children’s literature, particularly in classrooms with meager bookshelves. These kinds of experiences could steep children in rich content and vocabulary that assists reading comprehension in their later school years. (2)

Before the advent of newer technologies such as smartphones and touchscreen tablets, it was difficult for toddlers and young preschoolers to interact meaningfully with technology. Traditional keyboard-based devices such as desktop computers and laptops require a certain level of fine motor development to use the keyboard, along with a certain level of cognitive development to understand the symbols on the keyboard. These devices require skills that very young children may not have yet acquired, and they are therefore developmentally inappropriate.

However, new classes of devices are challenging the way we think about technology with children between the ages of 2 and 4 (Shuler 2009a, 2009b). “Mobile, multitouch screens and newer technologies have changed the way our youngest children interact with images, sounds, and ideas” (NAEYC & Fred Rogers Center 2012). Studies are now suggesting that children as young as 2 years old can easily interact with touchscreen technology (Chiong & Shuler 2010).

Touchscreen devices are more accessible for toddlers and young preschoolers than desktop computers and laptops, for several reasons. For example, most young children can explore touchscreen independently. The intuitive interface allows them to easily manipulate items on the screen with the skills they have already developed. Using a touchscreen surface, children can make choices from a variety of games and experiences; with a traditional laptop or desktop computer, they might require an adult’s help to change programs (Levine 2011). Tablets therefore give children more control over their computer experience. Two-year-old Mike (see “A 2-Year-Old Explores Shapes,” p. 60) was easily able to close programs when he finished with them and search for new ones to try.

Finally, the experience is active rather than passive. The touchscreen interface allows for interaction with the programs at a level not possible for very young children on traditional computers.

With tablets easier and engaging for toddlers and young preschoolers to use, thoughtful teachers keep in mind that “media and technology should not replace activities . . . that are important for children’s development” (NAEYC & Fred Rogers Center 2012, 5). However, “early childhood educators . . . carefully and intentionally use technology and media if and when it serves healthy development, learning, creativity, interactions with others, and relationships” (5). Tablets can offer young children valuable, authentic learning experiences that supplement traditional developmentally appropriate practices.

### Teachers’ experiences with tablets in toddler classrooms

To investigate the use of tablets among very young children and whether they can promote children’s creativity, communication, and collaboration, I enlisted the help of teachers Kellie and Shelly at a university child development center and Susan and Kathy in a local Head Start toddler class...
classroom. There were approximately 10 children in each classroom, ranging from 2 to 4 years of age. Some of the children had computers at home, but many did not.

I provided tablets for the teachers to use with the children. In some of the classes, the children were investigating the university marching band, marching band instruments, and the music that the band plays. The band had recently visited and played for the children. To support this investigation, I loaded the tablets with a number of short YouTube videos of the university marching band playing at the football field and in parades. I also loaded music from the band, music by John Philip Sousa, and several apps appropriate

A 2-Year-Old Explores Shapes—in 3-D and 2-D

My wife, Kamile, introduced our son Mike to the tablet computer when he was 22 months old. His interest was immediate and self-directed. Recognizing this, she installed a number of apps considered age appropriate for him. Mike had had previous experiences interacting with a smartphone (since 18 months) and had used some of the apps on that device. They included electronic books (Dr. Seuss’s ABC, The Wizard of Oz, Cloudy With a Chance of Meatballs) and content-specific games for learning the alphabet and shapes, since he had shown interest in those types of activities on a laptop. On a typical day, his technology use totaled about 15 minutes.

Here is an example of Mike at 26 months using the Toddler Teasers Shapes game, after becoming familiar with it.

Mike notices the tablet, which is turned off. He approaches his mother and says, “Michael want shapes game.”

Mike takes the iPad from his mother. He goes through the start-up procedures, scrolls through the different screens until he finds the Toddler Teasers Shapes game icon, and taps it. The game starts.

**Game:** Touch the circle.

**Mike:** Michael touch the circle!

**Game:** You touched the circle!

**Mike:** Michael want a semicircle.

**Game:** Touch the triangle.

**Mike:** Semicircle. [touches the semicircle]

**Game:** That’s a semicircle. Try again! Touch the triangle.

**Mike:** [touches the triangle]

**Game:** You found the triangle!

This interaction was straightforward for Mike, even at age 2. The device asked for an action (touch), and he made a cognitive decision and acted by touching a selection. He did not have to manipulate a mouse around a screen or decipher a keyboard to enter commands. Mike controlled the game and chose when to start and stop and how to interact with the app. It gave prompts that he could understand and easily respond to. It also provided feedback on his progress and made it clear what should happen next through verbal and visual cues. This was not a coercive activity; Michael chose to engage in it. The iPad was another toy for him to interact with. When he was tired of it, he found different toys to play with.

Mike also played with shape blocks with us. He enjoyed manipulating the blocks, banging them together, and stacking them. However, even when prompted by Kamile, Mike was not interested in learning the names of the shapes when playing with these materials. Only the tablet experience interested him in this.

Both experiences—playing with the shape blocks and using the tablet shape app—supported Mike’s development. He used the tangible, concrete objects to explore sensorimotor skills and build his knowledge of the physical properties of materials. Mike compared textures and shapes and used his motor skills to manipulate the blocks, some of which he couldn’t do on an electronic screen. However, his interactions with the tablet added other dimensions to learning about shapes. For example, he generalized the knowledge he gained from the electronic interactive game to everyday experiences. When getting out of the car on a clear night, Mike said, “Look, Daddy, a crescent moon!” A few days later he said, “Look, Daddy, a semicircle moon!” He began to notice shapes everywhere in his environment, from toys to food.

Mike’s two favorite apps are Trucks!! and Trucks and Tractors. Each includes pictures and videos of many different trucks and tractors. Trucks and Tractors has a visual menu of links to YouTube videos of trucks, tractors, and construction equipment. Mike easily navigated these apps and links and learned how to start, stop, and pause the videos. Because he controlled what and how to watch, he repeatedly watched the same three-minute video. This type of repetition is common to children of Michael’s age. He benefited from pursuing what interested him as many times as he wished, much like children enjoy reading and experiencing the same book over and over.

We provided books to supplement his digital investigation of trucks and tractors, and these different media supported his interest in learning all he could about these big machines.

Just as Mike had generalized his experiences with the shape game to other aspects of his play and everyday life, he drew from his interactions with the truck apps to fuel imaginative play with his toys. He created scenarios with garbage trucks based on what he had seen on the tablet apps. He used the apps to learn about garbage trucks and then carried that information over to his play.
for the children’s ages. These videos and apps offered open-ended exploration, peer interaction, and creative expression, and furthered the children’s investigation of their interests (such as the marching band videos).

The teachers were impressed by how easily the children used the tablets. Here is an excerpt from Kathy’s notes:

The next day I worked with three more children, one of whom had prior experience with the tablets. Instantly Josh was able to turn the tablet on by pushing the button and using his finger to slide and unlock. Jonah and Ryan pushed the button to turn the tablet on with guidance, and they needed my assistance to slide a finger to unlock it. I showed them the button to access the marching band videos. Josh had already touched the button and loaded a video he wanted to watch.

Later I helped David, Carter, and Lucy. When she could not get her video to open, Lucy said, “It doesn’t work.” She was touching the video but was not picking her finger back up to let it load. David and Carter did the same as Lucy and were not always successful in loading apps on their own. I showed them how to touch their fingers and let go so the apps would load.

The teachers reported that the children’s ability to work with the tablets and explore them independently was much greater than with traditional computers. Because the interface is so intuitive, using the device resembles how children play with other developmentally appropriate toys, such as blocks and paints. Children began to see the tablets as just one more medium for play and expression. They could create with paint and brushes or they could draw and color with their finger on a tablet. They could build with blocks or they could make a monster on the Elmo’s Monster Maker app and make it dance.

Using the tablets did not lead to passive learning experiences, the teachers found, but rather inspired the children to move like the marching band and share their experiences with each other. Children in the 2- and 3-year-old classroom selected and watched videos (often repeatedly, as they do with printed books) and said to each other, for example, “Look at that!” and “That’s a marching band!” Susan noted,

All four [children] were able to push the video button and load the screen. While watching the videos the children made comments, like “I live there” from David.
when he saw the word Ohio in the video and “Kendra [a teacher], where are you?” from Li. The children remembered that I used to be in the marching band. “You’re going upside down!” Lucy said while watching the band dance in the middle of their song. Casey said, “You were playing the drum,” when he saw the drum line.

The teachers noted how the easy access to media helped to make the group’s investigation of the marching band a richer experience. One of the difficulties in providing resources to aid toddlers and young preschoolers in their investigations is finding information in a format children can independently access. Books are a wonderful resource for finding answers to one’s questions, but children who don’t yet read may find them to be of limited value without an adult’s guidance. In this experience, the goal was to provide resources to children that they could choose to access when they had questions. In studying the marching band, many children had questions about the instruments. Though it was impractical to have all of the instruments in the classroom for children to explore, they used the tablets to find out what the instruments look and sound like. To find answers to their questions, they could access and watch the videos of the band to see the instruments, and they also used apps that simulated the instruments. These digital interactions prompted some children to seek out and play the drums in the classroom or dress up in a band outfit in the dramatic play area.

Another favorite with the children was the Elmo’s Monster Maker app, an interactive, open-ended program in which children add eyes, noses, mouths, and hats to different monster bodies. The program then animates the monsters, making them dance and interact with Elmo.

### Suggested iPhone and iPad Apps for Toddlers and Young Preschoolers

Apps listed as universal work on both the iPhone and iPad. Many of these apps and other very good educational apps are also available for the Android and other platforms.

- **Dr. Seuss’s ABC (universal)**, by Oceanhouse Media. Identical to the print version, but children can choose to have the book read aloud. Includes interactive images.
- **Elmo Calls (universal)**, by Sesame Street. Children call Elmo or receive audio or visual calls from him.
- **Elmo’s Monster Maker (iPhone)** and **Elmo’s Monster Maker HD (iPad)**, by Sesame Street. Children create their own monster and make it dance and interact with Elmo.
- **My Very First App (universal)**, by Night & Day Studios. Contains three levels of matching games (easy, medium, and hard) based on six of Eric Carle’s *My Very First Books*.
- **Peekaboo Barn (universal)**, **Peekaboo Forest (universal)**, and **Peekaboo Wild (iPhone)**, by Night & Day Studios. Each app presents animals and the sounds they make, with child or adult voiceovers saying each animal’s name.
- **Shapes (iPhone)**, by Toddler Teasers. Presents colorful quizzes on shapes with simple voiceovers.
- **Trucks!! (iPhone)**, by Wombat Learning Media, LLC. Four short videos of construction machines.
- **Trucks and Tractors (universal)**, by literalashore. A combination of slideshow and video show of trucks, tractors, and construction equipment.
The teachers used the tablets to help children develop and enhance their investigations—such as Shelly and the children in her group investigating the marching band. Kellie used a tablet to help the children explore superheroes. To document their investigation, Kellie displayed photos of the children on the tablet as they acted out their superhero play. This allowed children to easily revisit their actions, which led to further questions and enhanced the children’s explorations. They made up stories based on the pictures, which Kellie wrote down and displayed in the classroom. Children then asked for additional pictures of themselves portraying different actions to help illustrate their narratives. The planned one-week experience continued for more than four weeks, and the children in another classroom also became interested in superheroes and using the tablets in a similar way to support their investigations.

**Conclusion**

Educators are still exploring the potential of tablet-based computers in early childhood classrooms, but more and more schools and classrooms are finding new and innovative ways to use these tools. Each week new apps are released to explore the boundaries of what is possible with portable touchscreen devices. The creative use of these devices with young children can help to unleash their creative and intellectual potential.

**References**


