

Digital Learning and the Digital Classroom...A Very Real Concern by Rick Stephens and Elane V. Scott, Birth2Work

The promise and hope of every school district in America is being placed in digital devices and apps. Yet the warning signs abound about the dangers of children using digital tools too early and too often in their young lives. If the digital emphasis continues to be driven into the classroom at earlier and earlier grade levels, we could find ourselves in a world where students learn only enough facts to pass tests in school but, after they graduate from high school or college, are unable to find well paying jobs. And it won't be foreign competition or a poor economy that prevents them from getting jobs. It will be because our children haven't developed the abilities to innovate or create, and are thus not able to add true value to the workplace. Finding workplace success is increasingly about the ability to compete through creative thinking, innovation, adaptability and working in teams. These skills are not learned in the deterministic digital computer world, nor through the educational testing model that merely tests students' ability to regurgitate facts.

Technology has infused every part of our society, so why not schools? School leaders see computers and tablets as an opportunity to improve performance, manage costs, and as a mechanism to deal with issues that include second language learners, lack of student engagement, and other behavioral issues. Many claim that kids are "more engaged" in the classroom when using computers or tablets to learn. Further, many parents believe that the future success of their children will be based on their adeptness at moving freely, quickly, and easily in the digital environment. On the surface, and based on what an adult can do, these seem to be logical perspectives, and strong rationales to start kids using digital devices at an early age, but the data provides warning signs of a different story and potentially very concerning outcomes.

Brain scientists have shown that when children are young, the more multisensory their experiences are, the more neural pathways are created. The more pathways that are developed, the better capabilities a child will have in life. About one third of our brain is devoted to vision, and another third is devoted to the planning, orchestrating, and implementing of movement. In his book "*Digital Dementia: What We and Our Children are Doing to our Minds,*" Dr. Manfred Spitzer, Medical Director of the Psychiatric University Hospital, Ulm, Germany, highlights that holistic or multisensory (touch, sight, hearing, movement) learning develops fine motor control skills and is needed for higher level spatial cognition. These are not skills and capabilities learned by merely "swiping" a computer screen. If the neural pathways are not developed by the time a child is 2 or 3 years old, the foundation for future growth and development is not in place and learning at the normal age related rate becomes much more challenging.

What's more, Dr. Spitzer talks about the South Korean population being the most digital-using population in the world, and doctors are beginning to see young (student-aged) patients with memory and cognitive problems, conditions more commonly linked to brain injuries. Further, he states that children don't memorize anything, because they can just "Google it". Thus, if the answer is already there, students won't create it...they believe success is about "finding" the answer.

The fundamental concern is that children who regularly use digital devices at an early age, are using them at the expense of engaging in real life, multisensory experiences. Real life experiences create critical thinking capability in the brain. Usage of digital devices limits the brain development necessary for developing all forms of motor skills, such as running, swimming, holding small tools (such as pencils and pens) and throwing a ball. Without those neural pathways in place, the foundations for learning, creativity, and capabilities become far more limited. Kids need to stay away from computers and tablets in their early years!

Computers can't replicate a sense of touch, smell, weight, force, distance, or any of the other experiences important to brain development or learning. Playing games, such as tennis or golf on the Wii, for example, may be fun, but the fact is that one can not go to a tennis court or golf course after playing Wii and expect to have much (if any) proficiency. Playing on a screen, the player doesn't have to compensate for the affects of wind, or the sun, or muscle fatigue or the myriad other elements of real life that an actual athlete has to account for. Similarly, piloting a plane in a flight simulator is great for practicing procedures and processes, but the touch behind a yoke and throttle on takeoff as you feel the force on your body is not something one can get proficient in handling without actually flying.

Several years ago, iPad applications designed to be used by animals appeared on the market. Today more than a dozen games can be downloaded for use by cats and dogs, even penguins, tigers and frogs. Of particular note, though, is that playing the games does not calm the animals. Instead they get addicted (no longer doing anything else but sleeping, feeding and playing games), restless and hyperactive. While anecdotal, the observations are in line with research on mice watching TV for 6 hours a day during childhood and adolescence. The mice become irritable, inattentive, hyperactive, and display learning difficulties.

Because of the concerns and implications about children using computers, the American Academy of Pediatrics (AAP) offered guidance in 2013 about managing children and adolescent media use (<http://www.aap.org/en-us/about-the-aap/aap-press-room/pages/managing-media-we-need-a-plan.aspx>). Their conclusions were that excessive media use is tied to obesity, lack of sleep, school problems, aggression and other behavior issues. Further, they stated: "unrestricted playtime is critical to learning problem-solving skills and fostering

creativity”. A key recommendation from the AAP is that parents should: “Limit entertainment screen time to less than one or two hours per day; in children under 2, discourage screen media exposure.” To support this they further recommend that, “screens be kept out of kids’ rooms” and that parents establish media diets and “no technology zones” for their children.

A recent study by pediatricians from the Cohen Children's Medical Center of New York examined infants 0-3 years old that used touch-screen devices to determine if their use was of any educational benefit to infants and toddlers. The study showed that children who played non-educational games using touch-screen devices had lower verbal scores upon testing.

The results also showed that although the majority of parents cited in the study believed their children received educational benefits by using smart phones, readers and tablets, there was no statistical difference in developmental scores in children who played educational games versus non-educational games.

Beyond issues of motor skill development, no matter how much the digital world tries to simulate the real world interactions and critical thinking skills, it cannot. Digital devices, by design provide a very deterministic outcome. For example, to find something on the web, there is an algorithm that searches the millions of web sites and returns the findings on that thing that we want to know about. Executing the same search again will yield the exact same results. Even when the digital engagement creates alternative paths or choices, as in gaming, the choices are simplistic - right or wrong – and only serve to get the player to the next level. If the player chooses wrong, nothing happens. There are no real consequences. Computers do not replicate the complex interactions of emotion, visual cues or different behaviors that occur when people interact. Get two people together for a conversation and it will be different every time! The skills to observe, understand, adapt and react can't be learned on a computer, they have to be learned in direct dialog and interaction with others.

[A new survey conducted by Harris Poll](#) on behalf of CareerBuilder found that “Most employers (77%) say soft skills are equally important as hard skills. Interpersonal or people skills...are more important than ever in a job market brimming with diploma-sporting jobseekers duking it out in a shrunken pool of good jobs.” Sadly, with the best of intentions, parents and schools are going out of their way to sabotage children’s best learning opportunities by putting them in front of digital devices instead of engaging them in real life experiences.

There is evidence, too, that working on computers or tablets in the classroom, in lieu of using a pencil or pen, is further limiting early childhood brain development because of the implications on motor skill development. Magnetic resonance imaging has shown that writing not only develops fine motor skills, but also is key to increased brain development, something that does not occur in using a

keyboard, and definitely not in swiping a tablet! In China, because children are using keyboards to “type” their language, their ability to read has significantly diminished. This is because as scientists have learned that in a complex language like Chinese, in which symbols depict words and meaning, a lack of creating the written symbols results in an inability to decode the symbols and thus impacts the ability to read.

In 2012 an Israeli study of engineering students showed that comprehension and learning were better on paper than the computer. This is not a surprise, given the distractions that occur thru hyper-links and distractions that abound on the digital screen. As a result of this and other studies, there are some who now advocate for training bi-literate brains....those that can read for depth and understanding on paper and skim for information and context in the digital world. What does this mean for parents and schools? Computers in the classroom may have benefits for testing and assessment, but when it comes to teaching and real learning (not memorization), schools should focus on hands-on activities, concept understanding, and learning that involves multiple senses.

What’s more, is that many of the “tech wizards” of Silicon Valley – those thriving in the contemporary workforce, often cited as having reached the pinnacle of success in the technology field, are quietly raising their own children outside of the digital landscape. They send their children to schools such as Waldorf of the Peninsula, that eschews all technology in the classroom until high school! (*The New York Times*, October 22, 2011 “[A Silicon Valley School That Doesn’t Compute](#)”). The right learning environment is created there with a focus on ensuring children are capable of success ten, twenty and thirty years from now, no matter what the technology of tomorrow may be.

There is no question that technology and computers are here to stay. They are great tools and enhance our everyday lives. However, in the hands of a child, where development of the brain is critical and driven by engaging, multisensory activities, computers and tablets provide the wrong outcomes. There is no way that the simple “swipe” across the computer screen can have the same impact on early learning that using a pencil or pen, or throwing a ball, or having direct dialog with a classmate, can have on real learning. Let’s not be lulled into the belief that because children are quietly engaged with their tablet that real learning is occurring. After all, anyone with a computer and a bit of training can find anything on the internet. Even a cat can swipe at the screen and “play” on a tablet. To use information to solve problems requires an understanding of the real world that can only come from real world engagement and experience. It’s time we stopped believing that the computer is the solution for improving schools and ask ourselves why and how there are schools that do well despite not having computers in the classroom. When we understand that, we can start improving the outcomes of students so they will be successful after school, not just capable of finding data on the internet.