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Reader, Come Home: The Reading Brain in a Digital World
by Maryanne Wolf¹

Synthesis and Highlights²

"In our almost complete transition to a digital culture we are changing in ways we never realized would be the unintended collateral consequences of the greatest explosion of creativity, invention and discovery in our history." (Wolf, p. 3)

"The digital chain that leads from the proliferation of information to the gruel-thin, eye-byte servings consumed daily by many of us will need more than societal vigilance, lest the quality of our attention and memory, the perception of beauty and recognition of truth, and the complex decision-making capacities based on all of these atrophy along the way." (Wolf, pp. 85-86)

We are all changing. Immersed in the fast-paced 21st century digital culture, we are constantly adapting to the demands of an all-pervasive e-world and their contributions. New technologies enhance our lives and enable extraordinary strides in numerous fields, but they also are transforming how we process information, particularly *how we read*.

Dependent on digital tools and addictive devices with their relentless distractions, most of us resort to superficial skimming, browsing, surfing, and sound bites, with our minds darting from "one stimulus to another... with consequences none could have predicted." (p. 70) In contrast to the "deep reading" within print culture's emphases on reflection, contemplation, and analytical thinking, our fast-paced digital world emphasizes the proliferation of information, rapid rates of processing, and the bombardment of continuous stimuli. Imperceptibly, these characteristics of the digital medium threaten the quality of our attention, its consolidation in memory, and the time necessary for the perception of beauty – and the recognition of truth.

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The implications of this shift to a digital culture are important for everyone to understand, but they are profound for our children. The questions are multiple, particularly during the child's first 2,000 days, spanning from birth to age five. For example, what is the optimal timeframe for exposure to digital media? How best do parents leverage digital content during their children's subsequent 2,000 days (from five to ten years old)?

In *Reader, Come Home*, author Maryanne Wolf uses the optimistic concept of a "biliterate brain" to propose a framework in which our youngest members can be carefully taught the best uses of various mediums for different purposes. She recommends how teachers can learn to instill "code switching" skills in our youth in order to create a "biliterate" brain capable of deep reading across mediums. (pp. 168-171) Ensuring that our children become "expert, flexible" code switchers able to move easily between print and digital mediums – and truly benefit from the rich options afforded by new technologies – is both achievable and necessary, but it will require greater awareness and collective action.

Wolf describes how our generation has entered an historical "hinge moment," as we migrate from a print culture to a digital world. Raising key questions and sharing brilliant, groundbreaking research on what happens to the brain as it adapts to digital mediums, Wolf issues a clarion call for all of us to consider the serious and potentially dangerous impact of this cultural transition on the developmental reading skills of our children, particularly the underserved and those with reading challenges such as dyslexia. A noted educator, researcher and reading brain expert at the University of California, Los Angeles, Wolf provides us with key data that underscores both the threats and opportunities confronting our children. Below are highlights and key takeaways of this important research – a "need to know" for all parents and educators.

Some of the urgent questions Wolf raises for young and old alike include:

- Will the plasticity of the reading brain precipitate the atrophy of our most essential thought processes – critical analysis, empathy, and reflection – to the detriment of our democratic society? Will the formation of these same processes be threatened in our youth? (pp. 203-204)
- Specifically, will the "time-consuming, cognitively demanding deep-reading processes atrophy or be gradually lost within a culture whose principal mediums advantage speed, immediacy, high levels of stimulation, multitasking and large amounts of information?" (pp. 106-107)
- How can we ensure that our children develop the "deep reading" skills that enable them to strengthen their background knowledge, gain greater empathy and develop key skills such as critical thinking, problem solving and analytical thinking?

- What constitutes developmentally appropriate digital content and when/how long should a child be on any digital device? (pp. 144-146)
- Will our culture's continuous flow of information and distraction alter or diminish a child's attention and memory? (p. 123)
- Will ready access to answers on search engines cause older children to exert less effort to learn things for themselves? (p. 123)

Key Takeaways – What You Need to Know

A central goal of *Reader, Come Home* is to equip parents and educators with the information necessary to understand the impact of our e-world on the reading brain and assist them in making sound choices. We need to start with some general information about the human brain in order to fully understand the digital world's impact on our children's ability to read.

- Interestingly, humans were not born to read: reading is not “hardwired” like language, which is a basic human function. The process of learning to read led to a *rewiring* of the brain's circuits – and in the process transformed the nature of human thought.
- Our reading brains are malleable and have a certain *plasticity*. The brain can rearrange itself in multiple ways to read, forming new connected *circuits* based on environmental factors such as the language/writing system and reading mediums we use. In learning to read, each child must create a new reading circuit from prior cognitive structures.
- “What we read, how we read and why we read change how we think.” (p. 2) Research has confirmed the central role that *deep reading* plays in a child's ability to read – what they perceive, what they feel and what they know. This has huge implications for young children and suggests that the increasing shift from print reading to digital reading may impact the use of deep reading skills in their reading brain circuits.
- Each of us develops a unique “knowledge store” of information from the time of birth, derived in large part from what we read. This “background knowledge” is a personal, internal source of knowledge that we use to understand and predict whatever we read. Deep reading involves connecting our background knowledge to new information in the text, which in turn propels other critical skills like empathy, imagery, inference, critical analysis, novel thought, and reflection.
- Empathy – which enables us to “pass over” into the perspectives, emotions and feelings of others – is one of the most important aspects of the deep reading process. (p. 47) While many believe that empathy is an inherited trait, in fact, it is partially learned, and reading plays an important role in its development. According to recent, disturbing

research, there has been a decline of empathy among our youth. This is troubling to a society, because empathy is not only about being compassionate, but also involves a deeper understanding of “other people.” Little is more critical to enhancing the sense of connectedness among the diverse cultures in a democratic society and to reducing prejudices and fears. (p. 50)

- How we read differs considerably between print and digital. On digital screen, readers tend to skim, dart around and browse. Skimming, which has become the new normal for both children and adults, reduces the time for concentrated deep reading. (pp. 83-84)
- Child-raising in the digital age presents unique challenges as well as opportunities:
 - The young reading brain circuit develops over time and is based on many of the child’s characteristics: early language environment; type of instructions and support in preschool and school; and the medium(s) in which they are reading. Each of these can impact the development of their attention, memory and background knowledge before they even enter Kindergarten. In a digital world, learning to concentrate is increasingly challenging due to pervasive and competing distractions.
 - Young children become accustomed to and “gradually semi-addicted to continuous sensory stimulation” – often followed by boredom when the digital device is removed. (p. 110) There may be a “culturally induced, new form of boredom” following too much digital stimulation (p. 110), which may prevent children from entertaining themselves and pursuing real-world experiences, dampening creativity.
 - The more that devices are used, the more dependent the entire family becomes on access to digital sources of entertainment and information. Hyperattention, “continuous partial attention, and ‘environmentally induced attentional deficits’ pertain to us all.” (pp. 71-72)
 - Print books keep the focus on words and ideas as opposed to the more “game-like” aspects of e-books. (p. 144) Research has shown that e-books can have a potentially negative effect on comprehension and vocabulary development. (pp. 144-145) According to a recent study, students who read the same text on tactile, print mediums were superior to their screen-reading peers in sequencing and in their ability to reconstruct the plot in chronological order. (pp. 77-78)
 - Research has suggested that our digital society is “creating a cadre of children with environmentally induced attentional deficits because of the incessant, obsession-promoting hold that digital distractions pose for a child.” We have created a generation of distracted children and new forms of attention deficit. (p. 112)

- Each of the disadvantages of screen reading must be placed over the denominator of the multiple advantages for digitally-raised children that are essential for their future as citizens of the 21st century. Their immediate access to more information resources than ever before in the species' history means that there will be no simple "going back." (p. 114) Rather, it is critical that we learn how to preserve the deep reading skills of the print medium as we expand cognitive skills necessary for a range of digital mediums, some not yet invented.
- The goal is that the next generation will develop a code-switching *biliterate brain* that has internalized the best attributes of both print and digital reading. Ideally, children will become fluent in both modes of reading and learn how to deploy them for different reading purposes. (p. 186)

What Do We Need to Do?

Faced with the potentially profound implications of these findings for our youth and indeed our society, what are our responsibilities as parents, educators, physicians and researchers? How can we most effectively preserve deep reading and cultivate it in our children while also leveraging the expansive opportunities of digital tools?

Author Maryanne Wolf proposes a range of developmental suggestions:

- Before the age of two, emphasize human interaction and physical interaction with print books, both critical to the development of oral and written language and internalized knowledge. The tender ritual of book reading should begin as soon as the infant can sit on a loved one's lap. Shared storytelling experiences are central to the development of reading and language skills. Very limited contact with digital devices is recommended at this stage.
- Between the ages of two and five, continue daily print reading and ritualized bedtime reading. Through the reading of stories, children use their imaginations to travel to different places, meet different people and feel what it means to be kind to others and how it feels when someone is unfair or unkind. This is the "moral laboratory" where children develop perspective and empathy. (p. 137) Parents, caregivers and teachers should ask questions that encourage children to connect their background knowledge to what they read, elicit their empathy for different perspectives, draw inferences and share insights. The early roots of deep reading begin here.
- Carefully evaluate apps before purchasing to ensure that they are age appropriate, use them with the child at first, and then allow the child to explore. Do not use digital devices for more than 30 minutes per day for a two to five-year-old and aim for a maximum of two hours per day for a slightly older child. (p. 144)

- Many of the world's more than 1 billion cell phone users are children; we need to consider appropriate access and effective limits on these devices. (p. 125)
- We need to support more longitudinal research to better understand the positive and negative effects – including addictiveness – of various mediums on a child's development, particularly on their attention, memory and oral/written language development, and comprehension. This pertains to all children, but particularly those with specific challenges.
- As we move toward the development of a “biliterate” brain that preserves the critical benefits of print/deep reading and leverages the opportunities of digital mediums, we will want to emphasize print reading and the development of deep reading with print in early elementary ages. From Kindergarten on, the use of digital mediums for coding and programming will be emphasized, while print mediums will be used for the acquisition of reading. After basic fluent comprehension is well established, teachers should receive professional development on how to explicitly teach children to use deep reading skills with screens.
- As older children find their own balance for the best uses of print and digital media, “digital wisdom” should be part of the curriculum in schools, to ensure that critical thinking is used to evaluate the plethora of information they will consume.

At the end of her recommendations for the next generation, Wolf optimistically states that the ultimate goal is “the development of a truly biliterate brain with the capacity to allocate time and attention to deep-reading skills regardless of the medium ... [so that] by the time they are ten to twelve years old, most children will be proficient in reading on two mediums and multiple media, and able to switch effortlessly between them for different tasks.” (pp. 177-178) We all play a role in ensuring that *all children* achieve this goal; it is a responsibility that we as stewards of the next generation collectively share.

In the conclusion of her book, Wolf speaks to us all: “[T]he deep reading brain is both a real, flesh-and-cranial bone reality and a metaphor for the continuous expansion of human intelligence and virtue. If sometimes I am too fearful about short-circuiting it in future generations, I simultaneously hope and trust in this circuit's pluripotential capacities to embody all our species' exponentially growing intellectual, affective, and moral faculties. This is our generation's hinge moment: the time when we decide to take the true measure of our lives.” (p. 205)

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