

Getting Screens Out of Schools

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1:1 Ed Tech Screens are Hurting, Not Helping Student Learning

- Despite the push over the last decade to get every child a laptop or tablet, student math and reading scores have been declining in the United States. The COVID-19 pandemic certainly contributed significantly to the large drops in scores seen in the most recent 2022 assessment, but the numbers have been on the decline since 2012.¹ In 2022, “the math scores for the lowest performing students hit levels last seen in the 1970s, while their reading scores were actually lower than the first year the data was collected, in 1971.”²
- A 2020 study from the University of California, Los Angeles sheds further light on the issue. The study examined the impact of a one-laptop-per-child program. It found that increasing children’s access to computers and the internet did not improve educational outcomes, such as the number of years of education or enrollment in post-secondary education. “Despite a notable increase in computer access, educational attainment has not increased; the schooling gap between private and public-school students has persisted, despite closing the technology gap,” the study concluded.³
- It is also worth noting that countries that have invested heavily in computers have seen ‘no noticeable improvement’ in their results for the Programme for International Student Assessment (PISA) tests, according to a report by the Organisation for Economic Co-operation and Development (OECD). Andreas Schleicher, the OECD’s education director, says, “If you look at the best-performing education systems, such as those in East Asia, they’ve been very cautious about using technology in their classroom. Those students who use tablets and computers very often tend to do worse than those who use them moderately.”⁴
- A review by J-PAL concurred, finding that initiatives to expand access to computers “do not improve K-12 grades and test scores.”⁵ According to one study, even small daily amounts, defined as 30 minutes, of digital device use in the classroom are negatively related to reading comprehension scores.⁶
- Other research on how screens affect learning may explain why screens have not solved the educational inequalities as hoped. A study out of Norway found that “students who read texts in print scored significantly better on the reading comprehension tests than students who read the texts

¹ Ebony Walton, “Performance Declines in Basic Mathematics and Reading Skills Since the COVID- 19 Pandemic Are Evident Across Many Racial /Ethnic Groups,” NAEP Plus, November 9, 2023, nces.ed.gov/nationsreportcard/blog/pandemic_performance_declines_across_racial_and_ethnic_groups.aspx.

² Lauren Camera, “U.S. Teens’ Reading and Math Scores Feature Largest Declines Ever,” U.S. News & World Report, June 21, 2023, <https://www.usnews.com/news/education-news/articles/2023-06-21/u-s-teens-reading-and-math-scores-feature-largest-declines-ever>

³ Maria Lucia Yanguas, “Technology and Educational Choices: Evidence from a One- Laptop- per- Child Program,” *Economics of Education Review* 76 (2020), doi.org/10.1016/j.econedurev.2020.101984.

⁴ Matthew Jenkin, “Tablets Out, Imagination In: The Schools That Shun Technology,” *Guardian*, December 2, 2015, theguardian.com/teacher-network/2015/dec/02/schools-that-ban-tablets-traditional-education-silicon-valley-london.

⁵ J-PAL Evidence Review. 2019. “Will Technology Transform Education for the Better?” Cambridge, MA: Abdul Latif Jameel Poverty Action Lab.

⁶ Salmerón, L., Vargas, C., Delgado, P., & Baron, N. (2023). Relation between digital tool practices in the language arts classroom and reading comprehension scores. *Reading and writing*, 36(1), 175–194. <https://doi.org/10.1007/s11145-022-10295>

digitally.”⁷ And a study using “MRI scans of eight-to 12-year-olds showed stronger reading circuits in those who spent more time reading paper books than those who spent their time on screens.”⁸

- More recently, educational neuroscientists at the Teachers College of Columbia University found “evidence that children’s brains process written texts more deeply when they are presented in print rather than on a digital screen.” Brain activations they measured showed that after reading a text in print, children were more able to make connections with new concepts. The authors write that their findings “indicate that the meaning networks built during print reading are richer and deeper than those established during digital reading.”⁹
- It’s not just reading that’s being affected by technology in classrooms, writing is as well. Research shows that handwriting has cognitive benefits that typing on a screen does not. One study found that writing out the ABCs, as opposed to typing them, leads to better recognition of letters.¹⁰ Thus, “the clearest consequence of screens and keyboards replacing pen and paper might be on kids’ ability to learn the building blocks of literacy—letters.”¹¹ In addition, writing by hand improves memorization of words.¹²
- Critically, EdTech-induced learning loss especially affects the lowest-achieving students. The three major educational assessments—NAEP, TIMSS, and PISA—have all revealed growing “achievement gaps” between high-achieving and low-achieving students. This is true across multiple disciplines. The data from all three of these assessments show that the achievement gap in mathematics has widened over the past decade, and this trend began before the pandemic.¹³ The lowest performing students show the steepest declines. NAEP data on reading scores, particularly in eighth grade, shows a high-low gap as well. While the scores of students at or above the 75th percentile in reading stayed relatively the same, scores of students at or below the 25th percentile have declined since 2017.¹⁴ Finally, TIMSS data shows a high-low gap in science scores in eighth grade, particularly between 2015 and 2019.¹⁵

⁷ Anne Mangen, Bente R. Walgermo, and Kolbjørn Brønnick, “Reading Linear Texts on Paper Versus Computer Screen: Effects on Reading Comprehension,” *International Journal of Educational Research* 58 (2013): 61–68, doi.org/10.1016/j.ijer.2012.12.002.

⁸ Holly Korbey, “How to Teach Kids Who Flip Between Book and Screen,” *MIT Technology Review*, April 19, 2023, technologyreview.com/2023/04/19/1071282/digital-world-reshaping-childrens-education-reading.

⁹ “Children Derive Deeper Meaning from Printed Texts Than Screens, According to New Brain Study from Teachers College, Columbia University,” *Teachers College Columbia University*, May 29, 2024, tc.columbia.edu/tcgeneration/what-we-do/media-relations/press-releases/2024/children-derive-deeper-meaning-from-printed-texts-than-screens/.

¹⁰ Marieke Longcamp, Marie-Thérèse Zerbato-Poudou, and Jean-Luc Velay, “The Influence of Writing Practice on Letter Recognition in Preschool Children: A Comparison Between Handwriting and Typing,” *Acta Psychologica* 119, no. 1 (2005): 67–79, doi.org/10.1016/j.actpsy.2004.10.019.

¹¹ Jonathan Lambert, “Why Writing by Hand Beats Typing for Thinking and Learning,” *NPR*, May 11, 2024, npr.org/sections/healthshots/2024/05/11/1250529661/handwriting-cursive-typing-schools-learning-brain.

¹² Aya S. Ihara et al., “Advantage of Handwriting over Typing on Learning Words: Evidence from an N400 Event-Related Potential Index,” *Frontiers in Human Neuroscience* 15 (2021), doi.org/10.3389/fnhum.2021.679191.

¹³ International Association for the Evaluation of Educational Achievement (IEA), *Trends in International Mathematics and Science Study (TIMSS)*, 1995, 1999, 2003, 2007, 2011, 2015, 2019, 2023; Organization for Economic Cooperation and Development (OECD), *Program for International Student Assessment (PISA)*, 2000, 2003, 2006, 2009, 2012, 2015, 2018, and 2022 Mathematics, Reading, and Science Assessments; U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, *National Assessment of Educational Progress (NAEP)*, 1990, 1992, 1996, 2000, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2022, and 2024 Mathematics Assessments.

¹⁴ U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, *National Assessment of Educational Progress (NAEP)*, 1992, 1994, 1998, 2002, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2022, and 2024 Reading Assessments.

¹⁵ International Association for the Evaluation of Educational Achievement (IEA), *Trends in International Mathematics and Science Study (TIMSS)*, 1995, 1999, 2003, 2007, 2011, 2015, 2019, 2023.

The evidence is clear – it is time to get 1:1 screens out of schools. Here are actions schools, school districts, and/or states can take to move learning away from the interface of screens, to help improve student learning:

Policy Ideas

- Instead of replacing and refurbishing 1:1 educational screens for students, which is a huge expense for schools, choose to invest in a dedicated school computer lab instead, where students can learn to use computers in computer courses and use them to conduct research or complete assignments during after school hours or study hall periods. Other schools are transitioning to computer carts, where there is no dedicated 1:1 device for each student, but there are computers that can be brought in for use by a class for a specific purpose.
- Schools should invest in paper textbooks for students and classrooms. Sweden became one of the first nations in the world to adopt modern ed-tech learning methods, replacing textbooks with screens in 2009, inspiring others to follow suit. Now they are reversing course because the data has not borne out. Attention spans are shorter, and learning has not improved. Their government is expected to invest \$1.2 million to provide every Swedish student with paper textbooks for each subject by the end of 2025.¹⁶ The United States should not be afraid to do the same.
- States should require all schools to administer state-standardized testing by paper and pencil rather than on screens. The studies presented above demonstrate how students comprehend text more deeply reading it on paper than on a screen and make more connections, and how students who read texts in print scored significantly better on the reading comprehension tests than students who read the texts digitally. There is strong evidence that students will score better, especially in the reading and writing portions of tests, if they are taken on paper instead of a screen. Testing on paper will also help students in classical and other low-tech schools who are not used to learning or testing through the interface of a screen, perform better on these tests.

¹⁶ Mathias Curl, “In 2009, Sweden chose to replace books with computers. 15 years later, it allocates 104 million euros to reverse course,” Indian Defence Review, January 13, 2025, <https://indiandefencereview.com/in-2009-sweden-chose-to-replace-books-with-computers-15-years-later-it-allocates-104-million-euros-to-reverse-course/>