

*Chromebook Remorse: Tech Backlash at Schools Extends Beyond Phones*

*Representative Caldwell 7895*

**No more YouTube or video games on school laptops. Textbooks and pencils are back. Some seventh graders say they prefer learning offline.**



Listen · 9:44 min

**By Natasha Singer Visuals by David Robert Elliott**

Natasha Singer reported from McPherson, Kan.

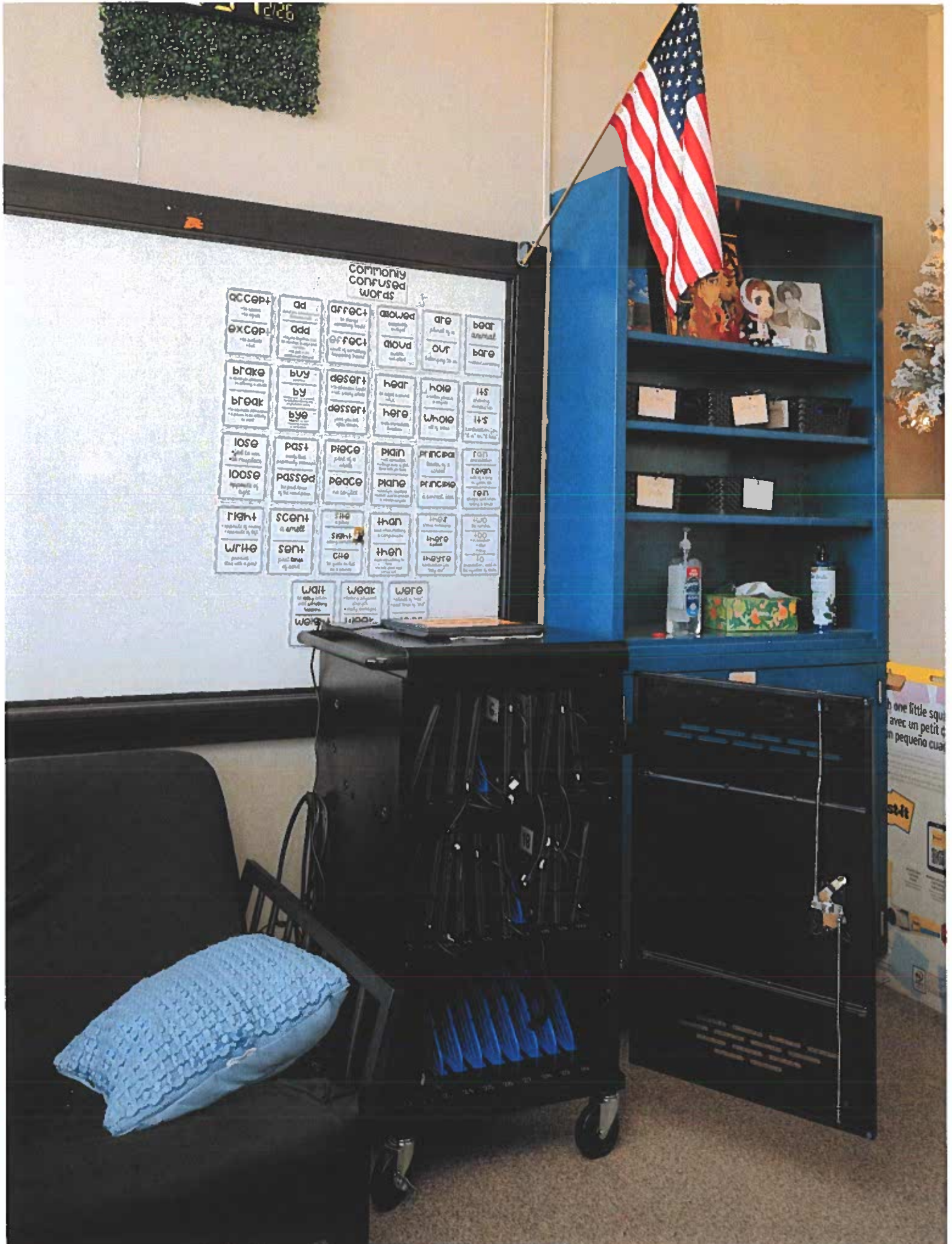
March 29, 2026

**Inge Esping, the principal of McPherson Middle School, has spent years battling digital devices for children's attention.**

**Four years ago, her school in McPherson, Kan., banned student cellphones during the school day. But digital distractions continued. Many children watched YouTube videos or played video games on their school-issued Chromebook laptops. Some used school Gmail accounts to bully fellow students.**

**In December, the middle school asked all 480 students to return the Chromebooks they had freely used in class and at home. Now the school keeps the laptops, which run on Google's Chrome operating system, in carts parked in classrooms. Children take notes mostly by hand, and laptops are used sparingly, for specific activities assigned by teachers.**

**“We just felt we couldn't have Chromebooks be that huge distraction,” said Ms. Esping, 43, Kansas' 2025 middle school principal of the year. “This technology can be a tool. It is not the answer to education.”**



Commonly Confused Words					
<b>accept</b> to receive or regard as valid	<b>ad</b> an announcement or notice	<b>affect</b> to bring about or influence	<b>allowed</b> permitted or authorized	<b>are</b> plural of is	<b>bare</b> without covering
<b>except</b> with the exception of	<b>add</b> to join or put together	<b>effect</b> result of something	<b>aloud</b> audibly or loudly	<b>our</b> belonging to us	<b>bare</b> without covering
<b>brake</b> to stop or slow down	<b>buy</b> to purchase	<b>desert</b> to leave or abandon	<b>hear</b> to listen or understand	<b>hole</b> an opening or gap	<b>its</b> possessive pronoun
<b>break</b> to separate or shatter	<b>by</b> near or close to	<b>dessert</b> sweet course	<b>here</b> in this place	<b>whole</b> entire or complete	<b>its</b> possessive pronoun
<b>lose</b> to misplace or be without	<b>past</b> previously mentioned	<b>piece</b> part of a whole	<b>plain</b> flat or level	<b>prince</b> ruler of a state	<b>rain</b> precipitation
<b>loose</b> not fastened	<b>passed</b> gone by	<b>peace</b> absence of war	<b>plane</b> flat surface	<b>principle</b> basic truth	<b>rain</b> precipitation
<b>right</b> correct or just	<b>scant</b> meager	<b>the</b> definite article	<b>than</b> comparison	<b>there</b> location	<b>to</b> infinitive particle
<b>write</b> to put words on paper	<b>sent</b> past tense of send	<b>sign</b> mark or symbol	<b>then</b> time or sequence	<b>there</b> location	<b>to</b> infinitive particle
<b>wait</b> to stay or remain	<b>weak</b> lacking strength	<b>were</b> past tense of be	<b>were</b> past tense of be	<b>were</b> past tense of be	<b>were</b> past tense of be



McPherson Middle School no longer gives students their own Chromebooks to use in school and take home. The laptops are now kept in classroom carts and used only for specific activities assigned by teachers.

McPherson Middle School, about an hour's drive from Wichita, is at the forefront of a new tech backlash spreading in education: Chromebook remorse.

For years, giants like Apple, Google and Microsoft have fiercely competed to capture the classroom and train schoolchildren on their tech products in the hopes of hooking students as lifelong customers. For more than a decade, tech companies have urged schools to buy one laptop per child, arguing that the devices would democratize education and bolster learning. Now Google and Microsoft, along with newcomers like OpenAI, are vying to spread their artificial intelligence chatbots in schools.

But after tens of billions of dollars of school spending on Chromebooks, iPads and learning apps, studies have found that digital tools have generally not improved students' academic results or graduation rates. Some researchers and organizations like UNESCO even warn that overreliance on technology can distract students and impede learning.

Schools in North Carolina, Virginia, Maryland and Michigan that once bought devices for each student are now re-evaluating heavy classroom technology use. And Chromebooks, the laptops most popular with U.S. schools, have emerged as a focal point. School leaders, educators and parents described the laptop curbs as an effort to refocus schooling on skills like student collaboration and conversation.

**“We’re not going back to stone tablets,” said Shiloh Vincent, the superintendent of McPherson Public Schools. “This is intentional tech use.”**

**The classroom device pullback is the latest sign of a growing global reckoning over how tech giants and their products have upended childhood, adolescence and education.**

**In a landmark verdict last week, a jury found the social media company Meta and the Google-owned YouTube liable for hooking and harming a minor. More than 30 states have limited or banned student cellphone use at school. Last year, Australia began requiring social media companies to disable the accounts of children under 16, a move that other countries are considering.**

**Now children’s groups and educators concerned about screen time are turning their attention to school-issued laptops and learning apps. Parents are flocking to support efforts, like Schools Beyond Screens and the Distraction-Free Schools Policy Project, to vet and limit school tech.**

**At least 10 states, including Kansas, Vermont and Virginia, have recently introduced bills to restrict students’ screen time, require proof of safety and efficacy for school tech tools or allow parents to opt their child out of using digital devices for learning. And Utah recently passed a law that would require schools to provide monitoring systems for parents to see which websites their children had visited — and how much time they spent — on school devices.**

Some parents are particularly concerned about YouTube, saying the platform has steered children to inappropriate videos on school devices. Gov. Gavin Newsom of California, a Democrat, recently expressed concern that one of his school-age sons had watched YouTube videos of manosphere podcasters on his school laptop.

“It was his school device,” Mr. Newsom said during a podcast interview this month. “It was YouTube. It was the Chromebook and all these algorithms.”

Google said it provided tools for schools to lock students’ Chromebook screens, restrict the content they saw, manage their YouTube access and disable Chromebooks after school hours. The company said it also turned off YouTube by default for K-12 students with school-issued Google accounts.

In a small town surrounded by wheat fields, McPherson Middle School serves sixth through eighth graders in a red brick schoolhouse built in 1938. In science class, eighth graders sit at vintage lab tables next to cabinets brimming with old microscopes. The school auditorium still has its original wooden seating.

“We already have a little bit of an old-school vibe for sure,” said Ms. Esping, now in her fourth year as principal.

**McPherson's mixed experience with Chromebooks reflects decades of school technology adoption and disappointment, a pattern that shows why some school districts are now pulling back on device use.**

**She is also revisiting years-old school tech decisions.**

In 2016, as part of the national trend, administrators at McPherson decided to buy a \$225 Chromebook for every middle schooler. Google had introduced the low-cost laptops five years earlier, with a pitch that the tech would help equalize learning opportunities and equip students with vital career skills.

“The individual use of Chromebooks is a way to empower students to maximize their full potential,” the middle school’s device policy explained in 2016.

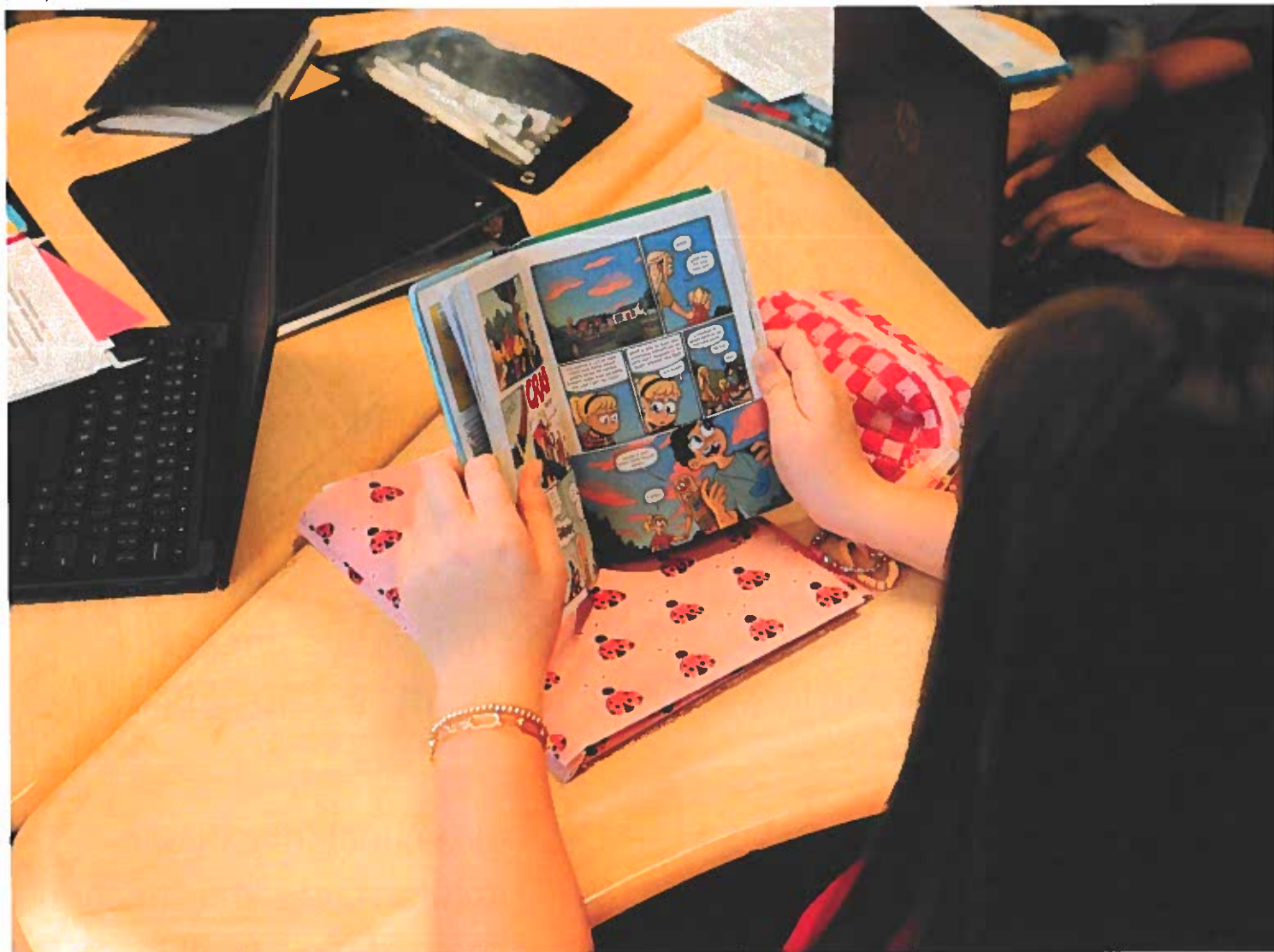
School leaders were enthusiastic.

“The general idea was: Students are going to be more engaged because it’s online — and how exciting for them!” Ms. Esping recalled.

To capitalize on the Chromebooks, the middle school invested in online textbooks and learning apps. But administrators, parents and students found that some of the platforms seemed too gamelike or did not work as advertised.

The coronavirus pandemic only increased school reliance on tech tools. In 2021, Chromebook shipments to schools more than doubled to nearly 16.8 million, compared with shipments in 2016, according to Futuresource Consulting, a market research firm.

When Ms. Esping took over as principal in 2022, she worried that rampant tech use was hindering learning. So the school banned student cellphones.



When students finish their lessons in English Language Arts class, they are allowed to read novels and other books.

Online bullying and disciplinary incidents quickly decreased, she said. But online distractions continued.

Some students became so hooked on playing video games on their Chromebooks that teachers had difficulty getting them to concentrate on their schoolwork, administrators and teachers said.

Students also sent mean Gmail messages or set up shared Google Docs to bully classmates with comments. Hundreds of children logged on to Zoom meetings where they made fun of their peers,

teachers and students said.

The school blocked Spotify and YouTube on school laptops. Then administrators stopped students from messaging one another on school Gmail.

Even then, some educators said they were spending so much time policing student Chromebook use that it was detracting from teaching. Some parents complained their children were spending hours playing video games on their school-issued devices.

Although the idea of taking back students' Chromebooks seemed unorthodox, given U.S. schools' deep reliance on Google's sprawling education platform, the middle school went ahead. The changes took effect in January.

On one recent morning, school formally began with the Pledge of Allegiance, broadcast over school loudspeakers. Homeroom teachers then led group sessions on organizational and interpersonal skills to help children navigate life without their own laptops.

Homeroom topics have included tips for students on using paper planners for school assignments and doing homework during school hours. (Students who want to practice things like extra math problems online can borrow Chromebooks from the school library to take home.)

Teachers have also taught students how to play board and card games like Scattergories and Uno.

The new laptop minimalism has also changed core courses.

During a recent English class on writing thesis statements, Jenny Vernon, the teacher, gave seventh graders a choice. They could answer questions by hand on bright salmon-colored paper or use a class Chromebook. Most students chose the paper.

In a sixth-grade lesson on fractions, a teacher asked the class to convert three-twentieths into a percentage. Students each worked on the problem on small dry-erase boards. They balanced the boards on their heads to indicate they were ready to be called on.

At McPherson Middle, sixth graders solved math problems on small whiteboards. Then they balanced the boards on their head to signal they were done and ready to be called on.

Computer science classes promote purposeful tech use. In one recent lesson, students used Chromebooks to program sensors and LED lights.

“It’s coding the physical world,” said Courtney Klassen, the computing teacher. “It’s not just staring at the screen.”

Some students have welcomed the changes.

Jade LeGron, 13, said curtailing Chromebooks had been “super beneficial” because students had stopped fighting with teachers over video games and had less opportunity “to be mean to each other.”

Sarah Garcia, also 13, said spending less time online had prompted students to talk more. “Since we don’t have our Chromebooks in front of our face,” she said, “most people now interact with their, like, peers and stuff.”

The school is part of a trend. In Wichita, Marshall Middle School is trying “tech-free” Fridays. In January, the Kansas Senate introduced a school device bill that would prohibit laptops and tablets in kindergarten through fifth grade — while restricting device use for middle schoolers to just one hour during the school day.

Schools like McPherson say they are not just curbing Chromebooks to reduce children’s screen time. They are also aiming to refocus learning on child development, student-teacher interactions and old-fashioned fun.



Students also enjoy some old-fashioned fun.

“They’ve learned how to make darts again!” Ms. Esping exclaimed, pointing up at a student-made dart jutting out from a school hallway ceiling. “They are going back to the old ways of being ornery.”

**Natasha Singer** is a reporter for The Times who writes about how tech companies, digital devices and apps are reshaping childhood, education and job opportunities.

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A version of this article appears in print on , Section B, Page 1 of the New York edition with the headline: Beyond Phones, Schools Rethink Tech in Class

Student's Class Member ID: (redacted)

Student's Name: (redacted)

**NOTICE OF PROPOSED CLASS ACTION SETTLEMENT**

*Q.J. v. PowerSchool Holdings LLC, et al.*, Case No. 1:23-cv-05689  
(United States District Court for the Northern District of Illinois)

**Our Records Indicate that, while a Student, You or a Minor for Whom You Have Legal Responsibility Logged into Naviance and May Be Entitled to a Payment from a Class Action Settlement.**

***A Court authorized this Notice. You are not being sued. This is not a solicitation from a lawyer.***

This Notice is to inform you that a settlement has been reached in a class action lawsuit against PowerSchool Holdings LLC ("PowerSchool Holdings"); Hobsons, Inc. ("Hobsons"); Heap Inc. ("Heap"); and the Board of Education of the City of Chicago ("CPS") (collectively, the "Defendants"). The class action lawsuit seeks to recover against the Defendants for their alleged roles in the alleged non-consensual interception of students' confidential and sensitive communications while using education technology products offered by Hobsons and, later, PowerSchool Holdings, including a product commonly referred to as Naviance (the "Naviance Platform"). The class action lawsuit alleges violations of the Electronic Communications Privacy Act ("ECPA"), 18 U.S.C. § 2511(a); the California Invasion of Privacy Act ("CIPA"), Cal. Penal Code §§ 631-632; the Illinois Eavesdropping Act ("IEA"), 720 Ill. Comp. Stat. 5/14-1, *et seq.*; the Stored Communications Act ("SCA"), 18 U.S.C. § 2702(a)(1); the Illinois School Student Records Act ("ISSRA"), 5 Ill. Comp. Stat. 10/1, *et seq.*; and common law. The Defendants deny that they violated any law but have agreed to the settlement to avoid the uncertainties and expenses associated with continuing the case.

**Am I a Class Member?** Our records indicate you or a minor for whom you have legal responsibility may be a Settlement Class Member. The Settlement Class includes all persons in the United States who, while a student, logged into the product offered by Hobsons and, later, PowerSchool Holdings, that is commonly referred to as Naviance (the "Naviance Platform") at least once during the period beginning on August 18, 2021 and continuing through January 23, 2026 (the "Class Period").

If you have legal responsibility for multiple minor students who are included in the Settlement Class, you may receive multiple emails, each containing a unique Student Class Member ID located at the top of this Notice.

**What Can I Get?** If approved by the Court, the Defendants will establish a Settlement Fund of \$17,250,000 to pay all valid claims submitted by the Settlement Class, together with the cost to administer the settlement, the cost to inform people about the settlement, attorneys' fees, costs, and expenses, and a service award to the Class Representative. If you are entitled to relief, you may submit a claim to receive a *pro rata* (meaning equal) share of the Settlement Fund. The settlement also requires that:

- within thirty (30) days of entry of final judgment by the Court ("Final Judgment"), PowerSchool Holdings shall establish a web governance committee and for the next two years, it will not use within the Naviance Platform any analytics or advertising software, technology, and/or code offered or provided by any third party unless the committee determines that such use is consistent with applicable law at that time;
- within thirty (30) days of entry of Final Judgment, PowerSchool Holdings shall supplement its existing disclosures within the Privacy Statement on the student.naviance.com landing page of the Naviance Platform to notify students about third-party analytics and advertising technologies implemented within the Naviance Platform;
- upon entry of Final Judgment, PowerSchool Holdings shall instruct various third parties to delete within ten (10) days of Final Judgment all data and communications of Settlement Class Members who used the Naviance Platform during the Class Period and shall make a similar request to Gainsight, Inc. within ten (10) days of any decision to cease use of Gainsight's analytics technology;
- Within thirty (30) days of entry of Final Judgment, for a nine-month period, PowerSchool Holdings shall display via a banner on the student.naviance.com landing page of the Naviance Platform and a banner on the www.powerschool.com website a prominent notice about PowerSchool Holdings' commitment to privacy;
- CPS shall: (i) modify the terms of its future agreements with third parties that handle certain student data, student confidential information, and school student records to require compliance with various federal and state laws; and (ii) require annual attestations confirming that compliance; and

- within thirty (30) days of the entry of Final Judgment, Heap shall delete all data and communications obtained from Settlement Class Members during the Class Period.

**How Do I Get a Payment?** You must submit a timely and complete Claim Form no later than **July 27, 2026**. You can file a claim using the Student Class Member ID located above on the settlement website, located at [www.powerschoolnaviancenessettlement.com](http://www.powerschoolnaviancenessettlement.com) (the "Settlement Website"). Your payment will come by check unless you submit your claim online and elect to receive payment electronically by PayPal, Venmo, or Zelle. Only one claim may be submitted per Student Class Member ID.

**What are My Other Options?** You may exclude yourself from the Settlement Class by sending a letter to the Settlement Administrator, which must be postmarked or received no later than **July 13, 2026**. If you exclude yourself, you cannot get a settlement payment, but you keep any rights you may have to sue the Defendants over the legal issues in the lawsuit. You and/or your lawyer have the right to appear before the Court and/or object to the proposed settlement. Your written objection must be filed no later than **July 13, 2026**. Specific instructions about how to object to, or exclude yourself from (or "opt out" of), the settlement are available on the Settlement Website. If you file a claim or do nothing, and the Court approves the settlement, you will be bound by all of the Court's orders and judgments. In addition, all of your claims relating to the Defendants' alleged acts and/or omissions will be released.

**Who Represents Me?** The Court has appointed lawyer Scott R. Drury of Drury Legal, LLC, to represent the Settlement Class. This attorney is called Class Counsel. You will not be charged for Class Counsel. If you want to be represented by your own lawyer in this case, you may hire one at your expense.

**When Will the Court Consider the Proposed Settlement?** The Court will hold the Final Approval Hearing at **11 a.m. CT on August 19, 2026**, in Courtroom 1903 at the Everett McKinley Dirksen U.S. Courthouse, 219 South Dearborn Street, Chicago, IL 60604. At that hearing, the Court will: hear any objections concerning the fairness of the settlement; determine the fairness of the settlement; decide whether to approve Class Counsel's request for attorneys' fees and reimbursement of costs and expenses; and decide whether to award the Class Representative a service award of up to \$5,000 from the Settlement

Fund for his service in helping to bring and settle this case. Class Counsel may request reasonable attorneys' fees in an amount not to exceed 37% of the Settlement Fund, less Settlement Administration Expenses, litigation costs and expenses, and any service award, but the Court may award less than this amount. Class Counsel may also seek reimbursement of reasonable costs and expenses, as approved by the Court.

**How Do I Get More Information?** For more information, including the full Notice, Claim Form, and the operative settlement agreement go to [www.powerschoolinviaccesettlement.com](http://www.powerschoolinviaccesettlement.com), contact the Settlement Administrator at (833) 447-8852 or *Q.J. v. PowerSchool Holdings LLC, c/o Kroll Settlement Administration LLC, P.O. Box 225391, New York, NY 10150-5391*.



Exploitation Instead Of Education

*www*

Take Action

## Why is Google Chromebook on the 2026 Dirty Dozen List?

Schools started giving out Chromebooks for education, but too often they result in exploitation. From exposing kids to pornography or to predators on dating platforms, to failing parents with clunky, ineffective safety tools, Google's educational devices are a liability for kids, parents, and schools. Profit-driven design has trumped protection for too long. Google must stop shirking responsibility and make child safety the default.

Privacy choices

**Google Chromebooks have achieved market dominance in schools. But they are riddled with serious flaws that**



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jeopardize the safety and well-being of K–12 students.

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## The Problem



Samantha (pseudonym) was just 10 years old when her school-issued Google Chromebook changed her life.

Like so many students, Samantha was handed the device with the promise of learning in a safe environment. But what she received **instead** was exposure to a dark and dangerous side of the internet. Through the Chromebook, she accessed Discord, a platform that should have been out of reach for a child her age. It was there that she was targeted by a predator who sent her explicit and abusive messages, detailing ways this person planned to sexually assault her and even kidnap her.

Samantha's father discovered this abuse when helping her with homework, and he was horrified. Her parents, desperate to protect her, found themselves blocked by administrative restrictions, unable to manage the settings on her school-issued device.

The very tool meant to empower her education instead facilitated her victimization.

### **Background:**

Google has been embedding itself in schools for years, **promising** "education for today and beyond." And a core element of this business strategy has been to get their lightweight cloud-based laptops, Google Chromebooks, into the hands of students.

And it's worked. According to 2025 data from the **National Center for Education Statistics (NCES)**, "About 9 in 10 public schools (88 percent) have a 1-to-1 computing program that provides every student a school-issued device, such as a laptop or tablet for the 2024–25 school year." And a 2025 data summary **asserts** that **93%** of U.S. school districts "intend to purchase Chromebooks" specifically.

**Google Chromebooks have achieved market dominance in schools. But they are riddled with serious flaws that jeopardize the safety and well-being of K-12 students.**

At the heart of the issue is the Google Chromebook default settings, which have been reported to recklessly granting students essentially open access to almost the entire internet, exposing them to harmful content like **pornography**, violence, sextortion, and cyberbullying. And some have claimed that Google's search algorithms, designed to prioritize maximally "**engaging**" content, actively push dangerous material to minors, amplifying the risks.

These are glaring failures to prioritize child safety for devices intentionally marketed and given to children.

Further, while Chromebooks open the door to online harms, they also fail to provide schools and parents with the necessary warnings or the tools to appropriately manage these risks. The Admin Console, which is supposed to help configure safety settings, is not user friendly and requires constant upkeep and attention. A lawsuit on behalf of a minor who was abused via her Chromebook **states**:

*Google provides tools that, if used, can make its Products somewhat less dangerous, but schools must pay extra for them. And settings within its Admin Console may be reconfigured to make the Products less dangerous, but **they are overwhelming: potentially numbering over a thousand, they are ever-changing and difficult to navigate.** Thus, Google's Products are designed in a manner that is dangerous and difficult to reconfigure. They could and should be made safe out of the box. [emphasis added.]*

The same lawsuit goes on to **state**: "Google forces onto schools and parents the responsibility of making its Products less dangerous for students, and onto students the responsibility of not getting hurt while using them."

Even when fully implemented, these tools fail to address the inherent dangers of unrestricted internet access, leaving students exposed to harmful content and predatory behavior.

This issue hits especially close to home for the National Center on Sexual Exploitation. Back in 2021, Google Chromebooks earned a spot on our Dirty Dozen List because of their default settings. At the time, **Google promised to do better**, announcing changes to default safety settings and pledging to prioritize child safety. But those promises have fallen heartbreakingly short. The devastating story of Samantha, exploited through her school-issued Chromebook in 2023, is proof that Google has not kept its word.

**Despite being warned about these dangers years ago**, Google continues to design Chromebooks that allow open internet access, promote harmful content, and leave parents and schools helpless to shield their children.





# Proof: Evidence of Exploitation



**WARNING:** Any pornographic images have been blurred, but are still suggestive. There may also be graphic text descriptions shown in these sections. **POSSIBLE TRIGGER.**

*loom*

- ▶ 2025 Stories of Exposure to Pornography, Violent Video Games, and Loopholes for Communication
- ▶ LAWSUIT: 10-Year Old Harmed + Invasive Data Collection and Security Vulnerabilities on Chromebooks
- ▶ 14-Year Old Girl Targeted by Online Predators via Her School-Issued Chromebook
- ▶ REPORT: Nearly Half of Teens Who Viewed Porn During the School Day Saw it on School-Issued Devices
- ▶ Chromebook's Long History of Safety Problems



*loom*

## Requests for Improvement

Redesign Chromebooks with a safety-first approach.

*loom*

## Fast Facts

In 2024, over 38 million students used Chromebooks in K-12 schools worldwide and

including robust, default and locked safety settings that limit internet access to vetted, educational, age-appropriate content.

End exploitative data collection by halting student data harvesting without parental consent and ensuring full transparency and parental control over collected data.

Implement hardware-level controls to block students from bypassing safety and school-administered restrictions.

Enable effective offline functionality to reduce reliance on constant internet access and limit exposure to online risks.

Simplify and improve administrative tools, making the Admin Console user-friendly with intuitive, standardized safety settings activated by default.

93% of U.S. school districts planned to purchase Chromebooks in 2025.

As of 2025, education accounts for 60.1% of the global Chromebook market share.

The Chromebook market reached \$14.7 billion in 2025 and is projected to hit \$42.85 billion by 2034.

In 2022, a survey of 1,353 U.S. teens (ages 13-17) found 73% had seen pornography, with 41% among those who had been exposed reporting seeing pornography during the school day. Of teens who had seen pornography during the school day, nearly half (44%) reported having viewed pornography on school-owned devices.



## Resources



**The FdTech Law Center (FTLC)** works to hold education technology

→ companies legally accountable for the harm they inflict on students, families, and schools. If your child been harmed by their school-issued laptop or tablet, contact ETLC for a free case evaluation.

→ Protect Young Eyes: **The Complete Guide to Chromebook Parental Controls**

→ **Install Bark Monitoring for Chromebooks**

→ Defend Young Minds: **Chromebook Safety Made Simple: 5 Essential Tips For A Safer School Year (2024)**

## Recommended Reading



The Chronicle Herald:

How vulnerable are students on Chromebooks in schools?

[Read More](#)

CBC News:

N.S. mom alarmed after teen targeted by predators on school-issued laptop

[Read More](#)

EdTech Law Center:

School-Issued Computer Dangers and Harms

[Read More](#)

EdTech Law Center:

Three Lies About EdTech and the Law

[Read More](#)

New York Times:

The Screen That Ate Your Child's Education

[Read More](#)

# Share!

*Common*

**Help educate others and demand change by sharing this on social media or via email!**

Spread the word to hold Big Tech accountable. Use these free resources to post on social media or share via email. Your voice can create change!

FREE Media Kit



NATIONAL CENTER ON  
SEXUAL EXPLOITATION

# THE EDTECH REPORT

Research to know right now  
about technology in the classroom

by [Everyschool.org](https://www.everyschool.org)  
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## ABOUT THIS DOCUMENT

*The EdTech Report* isolates usable, evidence-based insights from the fields of EdTech, teaching and learning, and child development so that educators can embrace best practices with technology in the classroom.

When best practices with EdTech are embraced, students are better positioned to thrive physically, emotionally, socially, and academically.

Specifically, this document:

1. **Isolates research patterns.** Every insight here represents a pattern taken from *many studies*, not just the ones cited.
2. **Condenses scholarly research.** What is often hard to boil down and access is now here in simple summary form.
3. **Offers clear insights.** Clarity makes way for usability and action in education spaces.

## ABOUT EVERYSCHOOL.ORG

*The EdTech Report* is a resource created by EverySchool.org, an independent, research-based nonprofit whose mission is happier, healthier, smarter school communities through digital wellness. EverySchool.org created and maintains The EdTech Triangle, a research-based implementation model for technology in the classroom; as such, this document may act as a research-based explanation for that model.

## HOW TO USE THIS DOCUMENT

*The EdTech Report* has been designed to be used by educators and decision makers to create district, school, or classroom technology philosophies, plans, and curricula.

Specifically, educators and decision makers might:

1. **Discuss the insights** listed here at board, curriculum, or other meetings.
2. **Use the insights** here as rationale for adopting a specific EdTech policy, plan, or implementation model (such as The EdTech Triangle).

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# TEACHERS ARE UNIQUELY POWERFUL

Despite the changing landscape in education, teachers remain the most effective influence on learning. While various methods of teacher-directed instruction have been shown to produce above-average results (more than one year's growth during one year of school), typical uses of technology in the classroom—1:1 laptop/tablet programs, web-based learning, simulations, and gaming—yield less positive results (less than one year's growth during one year of school).<sup>1,2,3</sup> Technology is most powerful when in the hands of a teacher, or when used by students in concert with a teacher, rather than students working in isolation on their devices.<sup>4</sup> Compared to face-to-face engagement, screens are an impoverished stimulation for a child's developing mind.<sup>5</sup> In fact, Andreas Schleicher, a veteran education analyst, says that "In most of the highest-performing systems, technology is remarkably absent from classrooms."<sup>6</sup>

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<sup>1</sup> Hattie, J. (2009) *Visible Learning A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. New York, NY: Routledge

<sup>2</sup> Hattie, J. & Waack, S. (2018) Retrieved from <https://visible-learning.org/backup-hattie-ranking-256-effects-2017/>

<sup>3</sup> Bryant, J., Child, F., Dorn, E., & Hall, S. (2020) New global data reveal education technology's impact on learning.. Retrieved from <https://www.mckinsey.com/industries/education/our-insights/new-global-data-reveal-education-technologys-impact-on-learning>

<sup>4</sup> Bryant, J., Child, F., Dorn, E., & Hall, S. (2020) New global data reveal education technology's impact on learning.. Retrieved from <https://www.mckinsey.com/industries/education/our-insights/new-global-data-reveal-education-technologys-impact-on-learning>

<sup>5</sup> Ruder, D. (2019, June 19). Screen time and the brain. *Harvard Medical School*. Retrieved from <https://hms.harvard.edu/news/screen-time-brain>

<sup>6</sup> Ripley, A. (2010). Brilliance in a box. *Slate*. Retrieved from

<https://slate.com/news-and-politics/2010/10/what-do-the-best-classrooms-in-the-world-look-like.html>

# STUDENTS BENEFIT FROM TRANSFORMATIVE TECHNOLOGY

Over the last several decades, digital literacy has grown from simply the ability to use a word processing application to advanced technological skills that are ever-changing and often self-taught out of necessity.<sup>7</sup> Given the ever-evolving nature of technology, among the most important skills a student needs as they exit high school are critical thinking, collaboration, problem solving, digital literacy, and creativity.<sup>8</sup> When incorporating technology into high school curricula, educators must strike the fine balance to support and nurture the current state of adolescent brain development which seeks adventure, data, and connectedness,<sup>9</sup> with the need to provide students with an applicable skill set that will make graduates marketable to potential employers, vocational schools, or universities. Understanding complex applications not only provides students with an immediately marketable skill, but it also provides them with the experience of learning a complex skill, the foundation to build on that skill, and potentially transferable skills such as reasoning, creative thinking, mathematical modeling, special skills, and metacognition.<sup>10,11</sup> As job growth in STEM fields outpaces almost all other fields,<sup>12</sup> those positions are often the hardest to fill. The most fruitful implementation of technology in K-12 education is when opportunities are provided to high school students to gain exposure to—and perhaps even a mastery in—complex applications that produce a unique outcome or allow students to learn a high-level skill.

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<sup>7</sup> Christian, A. (2022). Why 'digital literacy' is now a workplace non-negotiable. Retrieved from <https://www.bbc.com/worklife/article/20220923-why-digital-literacy-is-now-a-workplace-non-negotiable>

<sup>8</sup> English, D., Cushing, E., Theriault, S., & Rasmussen, J. (2017). College and career readiness begins with a well-rounded education: Opportunities under the Every Student Succeeds Act. Retrieved from [https://ccrscenter.org/sites/default/files/AskCCRS\\_Well-Rounded\\_Education.pdf](https://ccrscenter.org/sites/default/files/AskCCRS_Well-Rounded_Education.pdf)

<sup>9</sup> Giedd, J. (2020). Adolescent brain and the natural allure of digital media. *Dialogues in Clinical Neuroscience*, 22 (2). Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7366946/>

<sup>10</sup> Scherer, R., Siddiq, F., & Sanchez-Scherer, B. (2021). Some evidence of the cognitive benefits of learning to code. *Frontiers in Psychology*, 12. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8458729/>

<sup>11</sup> Scherer, R., Siddiq, F., & Sanchez Viveros, B. (2019). The cognitive benefits of learning computer programming: A meta-analysis of transfer effects. *Journal of Educational Psychology*, 111 (5). Retrieved from <https://www.gwern.net/docs/psychology/2019-scherer.pdf>

<sup>12</sup> Christian, A. (2022). Why 'digital literacy' is now a workplace non-negotiable. Retrieved from <https://www.bbc.com/worklife/article/20220923-why-digital-literacy-is-now-a-workplace-non-negotiable>

# BIAS AND LACK OF RESEARCH FROM EDTECH COMPANIES

Researchers are finding widespread biases in studies conducted by the tech companies who sell devices and other tech products to schools.<sup>13,14</sup> When comparing replication studies done by an independent researcher to the research done by an app developer, the developer studies tended to post 80% higher academic gains.<sup>15</sup> In fact, “a report from the National Education Policy Center, a nonpartisan research group at the University of Colorado at Boulder, found the rapid adoption of the mostly proprietary technology in education to be rife with ‘questionable educational assumptions . . . self-interested advocacy by the technology industry, serious threats to student privacy, and a lack of research support.’”<sup>16</sup>

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<sup>13</sup> Miles, M. (2018, February 6) Tech companies are buying their own education research. That’s a problem. *Education Week*. Retrieved from

<https://www.edweek.org/leadership/opinion-tech-companies-are-buying-their-own-education-research-thats-a-problem/2018/02>

<sup>14</sup> Gabriel, T., & Richtel, M. (2011, October 8). Inflating the software report card. *The New York Times*. Retrieved from <https://www.nytimes.com/2011/10/09/technology/a-classroom-software-boom-but-mixed-results-despite-the-hype.html>

<sup>15</sup> Barshay, J. (2019, March 18). The dark side of education research: Widespread bias. *The Hechinger Report*. Retrieved from <https://hechingerreport.org/the-dark-side-of-education-research-widespread-bias/>

<sup>16</sup> Morris, B. & Hobbs, T. (2019, September 3). Schools pushed for tech in every classroom. Now Parents are pushing back. *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/in-a-school-district-where-technology-rules-grades-fall-parents-ask-why-11567523719>

# EDTECH AND TEST SCORES

Providing students with laptops, tablets, and e-readers has been shown to have a negative impact on test scores; in some cases, students score an entire grade level lower when using a device during all or almost all of their classes.<sup>17,18</sup> Even Intel admits that “there are no longitudinal, randomized trials linking eLearning to positive learning outcomes.”<sup>19</sup> Research suggests that simply removing devices from the classroom is “equivalent to improving the quality of the teacher by more than a standard deviation.”<sup>20</sup> In fact, the increasingly popular 1:1 programs in schools have been shown to be one of the least effective methods of integrating technology.<sup>21</sup> From 2000 to 2012, reading performance declined among students who use the Internet at school.<sup>22</sup> And, overall, incorporating technology into the classroom has not shown any appreciable improvements in reading, math, or science outcomes.<sup>23</sup>

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<sup>17</sup> Mourshed, M., Krawitz, M., & Dorn, E. (2017) How to improve student educational outcomes: New insights from data analytics. Retrieved from <https://www.mckinsey.com/industries/education/our-insights/how-to-improve-student-educational-outcomes-new-insights-from-data-analytics>

<sup>18</sup> Barshay, J. (2019, June 10). Research shows lower test scores for fourth graders who use tablets in schools. The Hechinger Report. Retrieved from <https://hechingerreport.org/research-shows-lower-test-scores-for-fourth-graders-who-use-tablets-in-schools/>

<sup>19</sup> Gabriel, T., & Richtel, M. (2011, October 8). Inflating the software report card. The New York Times. Retrieved from <https://www.nytimes.com/2011/10/09/technology/a-classroom-software-boom-but-mixed-results-despite-the-hype.html>

<sup>20</sup> Carter, S., Greenberg, K., & Walker, M. (2016, May 1). The impact of computer usage on academic performance: Evidence from a randomized trial at the United States Military Academy. Retrieved from <https://blueprintlabs.mit.edu/research/the-impact-of-computer-usage-on-academic-performance-evidence-from-a-randomized-trial-at-the-united-states-military-academy/>

<sup>21</sup> Visible Learning. (n.d.) Retrieved from <https://visible-learning.org/backup-hattie-ranking-256-effects-2017/>

<sup>22</sup> OECD (2015). Students, Computers and Learning: Making the Connection. PISA, OECD Publishing, Paris, <https://doi.org/10.1787/9789264239555-en>

<sup>23</sup> Wilson, E. (2019, April 24). Ed-Tech utopia is over. Education Next. Retrieved from <https://www.educationnext.org/ed-tech-utopia-is-over-personalized-learning/>

# SCREEN TIME CAN COMPROMISE CREATIVITY

Creativity, defined as the “production of something original and useful,” requires “divergent thinking (generating many unique ideas) and then convergent thinking (combining those ideas into the best result).”<sup>24</sup> As a society, our creativity is in decline, and our youngest children (Kindergarten–6th grade) are experiencing the most serious decline.<sup>25</sup> Due to the engaging nature of screens and the pre-programmed limits of technological applications, students can become complacent, allowing technology to set the parameters, impeding on their own skills and curiosity.<sup>26</sup> After just one hour of screen time daily, children demonstrate lower rates of curiosity.<sup>27</sup> Even applications marketed to engage creativity often engage student’s fingertips more than their creative minds.<sup>28</sup> To foster true creativity—the number one leadership trait identified by 1500 CEOs<sup>17</sup>— we must allow for boredom, encourage role-play/fantasy worlds, tolerate unconventional answers, allow space free from artificial limits for students to produce their own ideas and work, and reduce screen time to allow for creative activities to fill that time.<sup>29</sup> Ideally, teachers are focusing on intrinsic rewards (as opposed to extrinsic), delayed gratification, open-ended assignments, and intellectual risk-taking.<sup>30</sup>

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<sup>24</sup> Bronson, P., & Merryman, A. (2010, July 10). The creativity crisis. Newsweek. Retrieved from <https://www.newsweek.com/creativity-crisis-74665>

<sup>25</sup> Bronson, P., & Merryman, A. (2010, July 10). The creativity crisis. Newsweek. Retrieved from <https://www.newsweek.com/creativity-crisis-74665>

<sup>26</sup> Linn, S., Almon, J., & Levin, D. (2012, October 1). Facing the screen dilemma: Young children, technology and early education. Retrieved from <https://fairplayforkids.org/pf/facing-screen-dilemma/>

<sup>27</sup> Twenge, J. M., & Campbell, W. K. (2018, October 18). Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. *Preventive Medicine Reports*, 12, 271-283. doi: 10.1016/j.pmedr.2018.10.003

<sup>28</sup> Linn, S., Almon, J., & Levin, D. (2012, October 1). Facing the screen dilemma: Young children, technology and early education. Retrieved from <https://fairplayforkids.org/pf/facing-screen-dilemma/>

<sup>29</sup> 4 Bronson, P., & Merryman, A. (2010, July 10). The creativity crisis. Newsweek. Retrieved from <https://www.newsweek.com/creativity-crisis-74665>

<sup>30</sup> Britannica Editors. (2010, October 18). The decline of creativity in the United States: 5 questions for educational psychologist Kyung Hee Kim. Retrieved from <http://blogs.britannica.com/2010/10/the-decline-of-creativity-in-the-united-states-5-questions-for-educational-psychologist-kyung-hee-kim>

# PRINT IS POWERFUL

Reading comprehension is significantly greater when students read in print as opposed to digitally.<sup>31</sup> Students who read printed texts are more likely to engage in deep reading and concentrated reading, while those who read digitally spend more time scanning, key-word spotting, and browsing.<sup>32</sup> Compared to paper, screens are not able to recreate the tactile experience that people need to connect with written material in a satisfying way.<sup>33</sup> Students reading on a screen rely on “remembering” more than “knowing,” while students who read in print more often “know” the answer (indicating a deeper level of learning and retention).<sup>34</sup> Although the idea of hyperlinks in electronic textbooks may seem appealing, in reality, hypertext is distracting, decreases sustained attention, and promotes more fragmented reading.<sup>35</sup> Children who read on-screen are nearly twice less likely to be above-average readers, and they are three times less likely to enjoy reading.<sup>36</sup>

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<sup>31</sup> Mangen, A., Walgermo, B., & Bronnick, K. (2013, January 5). Reading Linear Texts on Paper Versus Computer Screen: Effects on Reading Comprehension. *International Journal of Educational Research*, 58, 61-68. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0883035512001127?via%3Dihub>

<sup>32</sup> Liu, Z. (2005). Reading behavior in the digital environment. *Journal of Documentation*, 61(6), 700-712. doi: 10.1108/00220410510632040

<sup>33</sup> Jabr, F. (2013). The reading brain in the digital age: The science of paper versus screens. *Scientific American*. Retrieved from <https://www.scientificamerican.com/article/reading-paper-screens/>

<sup>34</sup> Jabr, F. (2013). The reading brain in the digital age: The science of paper versus screens. *Scientific American*. Retrieved from <https://www.scientificamerican.com/article/reading-paper-screens/>

<sup>35</sup> Mangen, A., Walgermo, B., & Bronnick, K. (2013, January 5). Reading Linear Texts on Paper Versus Computer Screen: Effects on Reading Comprehension. *International Journal of Educational Research*, 58, 61-68. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0883035512001127?via%3Dihub>

<sup>36</sup> Abrams, D. (2013). As kids' on-screen reading overtakes print, outcome is worrisome. Retrieved from <https://publishingperspectives.com/2013/05/as-kids-on-screen-reading-overtakes-print-outcome-is-worrisome/>

# HANDWRITING AIDS MEMORY AND DEEP LEARNING

Laptop notetakers performed worse than longhand notetakers when recalling factual content and demonstrating conceptual understanding.<sup>37</sup> Printing and cursive writing utilize different brain functions than keyboarding, and producing letters, stroke by stroke, improves our ability to process information.<sup>38,39</sup> Even when device usage is limited to just note-taking, shallower processing of the material may occur, leading to diminished learning.<sup>40</sup> By writing, we process material more deeply, and the act of handwriting “engages the thinking part of the mind.”<sup>41</sup>

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<sup>37</sup> Mueller, P. A., & Oppenheimer, D. M. (2014, April 23). The pen is mightier than the keyboard. *Psychological Science*, 25(6), 1159-1168. doi: 10.1177/0956797614524581

<sup>38</sup> Bach, D. (2014, December 23). UW Prof: Handwriting engages the mind. Retrieved from <https://www.washington.edu/news/blog/uw-prof-handwriting-engages-the-mind/>

<sup>39</sup> Beminger, V. W., Abbott, R. D., Jones, J., Wolf, B. J., Gould, L., Anderson-Youngstrom, M., Shimada, S., & Apel, K. (2006) Early development of language by hand: Composing, reading, listening, and speaking connections; Three letter-writing modes; and fast mapping in spelling. *Developmental Neuropsychology*, 29(1), 61-92. doi:10.1207/s15326942dn2901\_5

<sup>40</sup> Mueller, P. A., & Oppenheimer, D. M. (2014, April 23). The pen is mightier than the keyboard. *Psychological Science*, 25(6), 1159-1168. doi: 10.1177/0956797614524581

<sup>41</sup> Bach, D. (2014, December 23). UW Prof: Handwriting engages the mind. Retrieved from <https://www.washington.edu/news/blog/uw-prof-handwriting-engages-the-mind/>

# TIME LIMITS MATTER

Despite reassurances from tech companies that educational screen time “doesn’t count” in the same way recreational screen time does, screen time itself— the often sedentary, isolating act of being on a screen— has deleterious effects. Numerous studies have demonstrated structural and functional changes in the brain related to screen time including brain atrophy, reduced cortical thickness, and damage to the frontal lobe.<sup>42</sup> Massive brain changes are occurring throughout childhood, but specifically in infancy and adolescence.<sup>43</sup> During this vital time of development, our brains rapidly prune skills we aren’t using and strengthen the ones we do use.<sup>44</sup> We are often told to balance screen time with physical activity, but the actual amount of time spent on a screen, regardless of physical activity, does affect physical and mental health.<sup>45</sup> In fact, the recommendation of no more than 2 hours of technology a day for school aged children is supported by research.<sup>46</sup>

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<sup>42</sup> Dunckley, V. (2014, February 27). Gray matters: Too much screen time damages the brain. *Psychology Today*. Retrieved from <https://www.psychologytoday.com/us/blog/mental-wealth/201402/gray-matters-too-much-screen-time-damages-the-brain>

<sup>43</sup> Waterman, M. (2018, April 2). Digital tech & kids- Neuroplasticity may be the least of our worries. *Hackermoon*. Retrieved from <https://medium.com/hackermoon/digital-tech-kids-neuroplasticity-may-be-the-least-of-our-worries-945f734e43d5>

<sup>44</sup> Page, A., Cooper, A., Griew, P., & Jago, R. (2010, October 11). Children’s screen viewing is related to psychological difficulties irrespective of physical activity. *Pediatrics*, 126(5), e1011-1017. doi: 10.1542/peds.2010-1154

<sup>45</sup> Page, A., Cooper, A., Griew, P., & Jago, R. (2010, October 11). Children’s screen viewing is related to psychological difficulties irrespective of physical activity. *Pediatrics*, 126(5), e1011-1017. doi: 10.1542/peds.2010-1154

<sup>46</sup> Page, A., Cooper, A., Griew, P., & Jago, R. (2010, October 11). Children’s screen viewing is related to psychological difficulties irrespective of physical activity. *Pediatrics*, 126(5), e1011-1017. doi: 10.1542/peds.2010-1154

# GAMIFICATION IS FRAUGHT WITH RESEARCH-BASED RED FLAGS

The research on educational games, which most often includes points-based or achievement-based play, shows mixed outcomes.<sup>47</sup> Some research shows positive effects,<sup>48</sup> while other studies show the learning gains they offer are shallow or short-lived.<sup>49,50</sup> Still other studies show that, compared to a control group, students using gamified curriculum exhibit less motivation, satisfaction, and empowerment, as well as scored lower in final exams.<sup>51</sup> In all, their total educational benefits are mostly inconclusive.<sup>52</sup> What's more, as every educational game is different and studies are lacking, it's not often possible for teachers to know which games to offer and which to avoid.<sup>53</sup> What we can say is that educational games mostly isolate students from face-to-face interactions and are often similar to their entertainment-based counterparts, which have been developed to lure us in with "hijacking techniques" and "compulsion loops,"<sup>54</sup> leading to concerns of compulsive habits and overstimulation. Given all these factors, educational games have been placed in the Restrictive category within The EdTech Triangle, and are recommended to be used only sparingly.

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<sup>47</sup> Dichev, C. & Dicheva, D. (2017, February 20). Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *Technology in Higher Education*. <https://doi.org/10.1186/s41239-017-0042-5>

<sup>48</sup> Dominguez, A., Saenz-de-Navarrete, J., de-Marcos, L., Fernandez-Sanz, L., Pages, C., Martinez Harraiz, J. (2013). Gamifying learning experiences: Practical implications and outcomes. *Computers & Education*, 63, 380-392. <https://doi.org/10.1016/j.compedu.2012.12.020>

<sup>49</sup> Snow, E., Allen, L., Jackson, G., & McNamara, D. (2015). Spendency: students' propensity to use system currency. *International Journal of Artificial Intelligence in Education*, 25(3), 407-427. doi: 10.1007/s40593-015-0044-1

<sup>50</sup> Toda, A., Valle, P., & Isotani, S. (2018). The dark side of gamification: An overview of negative effects of gamification in education. *Higher Education for All. From Challenges to Novel Technology Enhanced Solutions*. Retrieved from [https://www.researchgate.net/publication/326876949\\_The\\_Dark\\_Side\\_of\\_Gamification\\_An\\_Overview\\_of\\_Negative\\_Effects\\_of\\_Gamification\\_in\\_Education](https://www.researchgate.net/publication/326876949_The_Dark_Side_of_Gamification_An_Overview_of_Negative_Effects_of_Gamification_in_Education)

<sup>51</sup> Hanus, M. & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education*, 80, 152-161. <https://doi.org/10.1016/j.compedu.2014.08.019>

<sup>52</sup> Broer, J. (2014). Gamification and the trough of disillusionment. *Mensch & Computer Workshopband*. doi: 10.1524/9783110344509.389

<sup>53</sup> Dichev, C. & Dicheva, D. (2017, February 20). Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *Technology in Higher Education*. <https://doi.org/10.1186/s41239-017-0042-5>

<sup>54</sup> Brooks, D. (2017, November 20). How Evil is Tech? *The New York Times*. Retrieved from <https://www.nytimes.com/2017/11/20/opinion/how-evil-is-tech.html>

# SCREENS USE CAN BECOME HABITUAL

Screens are exciting and compelling, making it difficult for healthier hobbies, interests, or learning methods to compete.<sup>55</sup> Engagement is often cited as a primary reason for choosing tech in the classroom; however, that idea has been criticized, given that “keeping children engaged requires an environment of constant novelty, which cannot be sustained.”<sup>56</sup> Repeated behaviors (reaching for a device during downtime, filling a moment of boredom with an educational game, or engaging with a device over connecting to a peer) can become biologically compelled habits, making it more difficult for students to turn off screens as they become older.<sup>57</sup>

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<sup>55</sup> Lieber, C. (2018, August 8). Tech companies use “persuasive design” to get us hooked. Psychologists say it’s unethical. *Vox*. Retrieved from <https://www.vox.com/2018/8/8/17664580/persuasive-technology-psychology>

<sup>56</sup> Richtel, M. (2011, September 3). In Classroom of Future, Stagnant Scores. *New York Times*. Retrieved from <https://www.nytimes.com/2011/09/04/technology/technology-in-schools-faces-questions-on-value.html>

<sup>57</sup> Carr, Nicholas. (2011). *The Shallows*. New York, NY: W.W. Norton & Company, Inc.

# SCREEN TIME HAS BEEN LINKED TO A MYRIAD OF HEALTH CONCERNS

The effects of screen time on well-being are established. The more time children and adolescents spend looking at a screen, the lower their psychological well-being.<sup>58</sup> Adolescents who spend more time on non-screen activities (sports, social interaction, print media) are less likely to report depressive symptoms.<sup>59</sup> In fact, “all screen activities are linked to less happiness, and all non-screen activities are linked to more happiness.”<sup>60</sup> In regards to tech use, the list of mental health concerns is long (and not just in the context of excessive use). Many deleterious outcomes appear after just one to two hours of tech time per day. Concerns include sleep disruption, depression,<sup>61</sup> anxiety, loneliness, less curiosity, and difficulty making friends; other issues include difficulty staying calm, increased arguing with caregivers, and decreased ability to complete tasks and maintain focus.<sup>62</sup> More issues are decreased empathy,<sup>63</sup> obesity, impaired fine motor skills, and lower cardiovascular fitness.<sup>64</sup> Some of these outcomes may be due to the screen itself, but likely many arise as a result of what screens replace, including interactions with caring adults and face-to-face connections with peers.<sup>65</sup> When parents and teachers band together to promote healthy life habits, we produce a healthier generation of students.

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<sup>58</sup> Twenge, J. M., & Campbell, W. K. (2018, October 18). Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. *Preventive Medicine Reports*, 12, 271-283. doi: 10.1016/j.pmedr.2018.10.003

<sup>59</sup> Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2018). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010 and links to increased new media screen time. *Clinical Psychological Science*, 6(1), 3-17. doi: 10.1177/2167702617723376

<sup>60</sup> Twenge, J. M. (2017, September). Have smartphones destroyed a generation? *The Atlantic*. Retrieved from <https://www.theatlantic.com/magazine/archive/2017/09/has-the-smartphone-destroyeda-generation/534198/>

<sup>61</sup> Hysing, M., Pallesen, S., Storkmark, K., Jakobsen, R., Lundervold, A., & Sivertsen, B. (2014, December 2). Sleep and use of electronic devices in adolescence: results from a large population-based study. *BMJ Open*(5)1. <http://dx.doi.org/10.1136/bmjopen-2014-006748>

<sup>62</sup> Twenge, J. M., & Campbell, W. K. (2018, October 18). Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. *Preventive Medicine Reports*, 12, 271-283. doi: 10.1016/j.pmedr.2018.10.003

<sup>63</sup> Empathy. College students don't have as much as they used to. (2010, May 27). Retrieved from <https://news.umich.edu/empathy-college-students-don-t-have-as-much-as-they-used-to/>

<sup>64</sup> Holland, K. (2018, March 7). Too much technology: Children growing up with weak hands, fingers. *Healthline*. Retrieved from <https://www.healthline.com/health-news/too-much-technology-children-with-weak-hands>

<sup>65</sup> Linn, S., Almon, J., & Levin, D. (2012, October 1). Facing the screen dilemma: Young children, technology and early education. Retrieved from <https://fairplayforkids.org/pl/facing-screen-dilemma/>

# YOUNG STUDENTS AND SCREENS

Experiential learning, in which students are physically active in creative and self-initiated play, is necessary for healthy development in preschoolers and kindergartners.<sup>66</sup> Despite the popular view that children will be “left behind” if they are not exposed to digital devices from an early age, there is no research to support that this is true. On the other hand, creative and hands-on play has been linked to problem solving skills and creativity.<sup>67</sup> Research has shown that fast-paced media, especially in younger children, is linked to impaired executive function and lower ability to delay gratification.<sup>68</sup> The recent uptick in reduced fine motor skills in young children may be related to an increase in screen time exposure as well.<sup>69</sup> More than anything, devices in the classroom often displace other activities known to be more beneficial to the health and development of young students.<sup>70</sup> In summary, “healthy neural branching of the developing brain depends on close personal relationships with caring adults and on hands-on experiences in the real world.”<sup>71</sup>

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<sup>66</sup> Linn, S., Almon, J., & Levin, D. (2012, October 1). Facing the screen dilemma: Young children, technology and early education. Retrieved from <https://fairplayforkids.org/pl/facing-screen-dilemma/>

<sup>67</sup> Linn, S., Almon, J., & Levin, D. (2012, October 1). Facing the screen dilemma: Young children, technology and early education. Retrieved from <https://fairplayforkids.org/pl/facing-screen-dilemma/>

<sup>68</sup> Lillard, A. & Peterson, J. (2011, May 31). The immediate impact of different types of television on young children's executive function. *Pediatrics*(128)4, 644-649. doi:10.1542/peds.2010-1919

<sup>69</sup> Webster, E., Martin, C., & Staiano, A. (2018). Fundamental motor skills, screen-time, and physical activity in preschoolers. *Journal of Sport and Health Science*, 8, 114-121. <https://doi.org/10.1016/j.jshs.2018.11.006>

<sup>70</sup> Alliance for Childhood. (2004) Tech tonic: Towards a new literacy of technology [PDF file]. College Park, MD: Alliance for Childhood. Retrieved from [https://static1.squarespace.com/static/5d24bb215f3e850001630a72/v/5d3b45efc6c6f30001f68d63/1564165616445/Tech\\_Tonic.pdf](https://static1.squarespace.com/static/5d24bb215f3e850001630a72/v/5d3b45efc6c6f30001f68d63/1564165616445/Tech_Tonic.pdf)

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# SCREENS AND EYE PROBLEMS

Screens can cause eyestrain, headaches, and blurred vision; the effect can exhaust our mental and physical resources and make information recall more difficult.<sup>72</sup> The number of cases of nearsightedness now qualifies as an epidemic, with a rapid increase starting in 2007 when the smartphone was introduced.<sup>73</sup> The consequence of nearsightedness isn't just glasses—it also increases the risks of major eye disorders like retinal tearing, glaucoma, and cataracts. When tablets are used in classrooms with fluorescent lighting, the “effect is multiplied tenfold.”<sup>74</sup> Using a computer seven hours a week or more triples the risk for nearsightedness.<sup>75</sup> Prolonged use of tablets increases the negative effects, and one of the best protective factors—exposure to daylight— isn't always given the priority it deserves during the day. Increasing outdoor time during the school day contributes to a notable reduction in the risk of nearsightedness.<sup>76</sup>

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<sup>72</sup> Jabr, F. (2013). The reading brain in the digital age: The science of paper versus screens. *Scientific American*. Retrieved from <https://www.scientificamerican.com/article/reading-paper-screens/>

<sup>73</sup> Michaud, L. (2019, February 13) Too much screen time linked to an epidemic of myopia among young people. *The Conversation*. Retrieved from <https://theconversation.com/too-much-screen-time-linked-to-an-epidemic-of-myopia-among-young-people-111599>

<sup>74</sup> Michaud, L. (2019, February 13) Too much screen time linked to an epidemic of myopia among young people. *The Conversation*. Retrieved from <https://theconversation.com/too-much-screen-time-linked-to-an-epidemic-of-myopia-among-young-people-111599>

<sup>75</sup> CBS News. (2017, December 27). Too much screen time may be damaging children's eyesight. Retrieved from <https://www.cbsnews.com/news/digital-devices-screen-time-damaging-childrens-eyes-vision/>

<sup>76</sup> Welch, A. (2015, September 15). Kids who get more sunlight less likely to need glasses. *CBS News*. Retrieved from <https://www.cbsnews.com/news/kids-exposed-to-more-sunlight-less-likely-to-need-glasses/>

# CELL PHONES IN SCHOOLS CAN UNDERMINE LEARNING

Allowing personal devices in the classroom can lead to decreased attention and retention of material. Students who are allowed personal devices in the classroom perform significantly worse on exams compared to students without a personal device.<sup>77</sup> Divided attention, even for brief distractions, can affect long-term retention of material.<sup>78</sup> Access to a personal device makes multitasking more likely to occur, and the research is clear on the negative effects of multitasking on performance.<sup>79,80</sup> Banning cell phones significantly increases student performance, even more so among the lowest-performing students, making a school-wide cell phone ban one of the simplest ways to reduce educational inequality.<sup>81</sup> Aside from the academic concerns, one of the greatest costs of allowing cell phones in school is a student's ability to isolate, disengage from face-to-face connections, and participate in recreational online activities (including accessing age-inappropriate content and social media).

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<sup>77</sup> Glass, A. & Kang, M. (2019) Dividing attention in the classroom reduces exam performance. *Education Psychology*, 39(3), 395-408. <https://doi.org/10.1080/01443410.2018.1489046>

<sup>78</sup> Glass, A. & Kang, M. (2019) Dividing attention in the classroom reduces exam performance. *Education Psychology*, 39(3), 395-408. <https://doi.org/10.1080/01443410.2018.1489046>

<sup>79</sup> Ophir, E., Nass, C., & Wagner, A. D. (2009, July 20). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences of the United States of America*, 106(37), 15583-15587. doi: 10.1073/pnas.0903620106

<sup>80</sup> Bates, S. (2018, October 25). Heavy multitaskers have reduced memory. *Stanford News*. Retrieved from <https://news.stanford.edu/stories/2018/10/decade-data-reveals-heavy-multitaskers-reduced-memory-psychologist-says>

<sup>81</sup> Beland, L. & Murphy, R. (2015). Ill Communication: Technology, distraction, & student performance. Retrieved from <https://cep.lse.ac.uk/pubs/download/dp1350.pdf>

# SCREEN-BASED HOMEWORK RAISES CONCERNS

The data supporting the negative effects of too much recreational screen time is vast. However, parents are finding it difficult to limit recreational technology at home when their children are assigned digital homework.<sup>82</sup> Students intend to complete homework, and yet the distractions on a device are overwhelming.<sup>83</sup> Most students report high levels of distraction and small amounts of actual time spent on homework. In fact, only 3% of the time teens spend on a device is actually creating content, and the majority is passive consumption and communication.<sup>84</sup> Eliminating what is likely the greatest distraction—digital devices—will allow students to concentrate fully (one of the strongest predictors of future success) and more deeply understand new concepts.<sup>85</sup> Teachers can help parents reduce overall screen time by assigning screen-based homework only when it is truly necessary.

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<sup>82</sup> Morris, B. & Hobbs, T. (2019, September 3). Schools pushed for tech in every classroom. Now Parents are pushing back. *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/in-a-school-district-where-technology-rules-grades-fall-parents-ask-why-11567523719>

<sup>83</sup> Rideout, V. (2015, November 3). *The common sense census: Media use by tweens and teens*. Retrieved from <https://www.commonsensemedia.org/research/the-common-sense-census-media-use-by-tweens-and-teens-2021>

<sup>84</sup> Rideout, V. (2015, November 3). *The common sense census: Media use by tweens and teens*. Retrieved from <https://www.commonsensemedia.org/research/the-common-sense-census-media-use-by-tweens-and-teens-2021>

<sup>85</sup> Schwartz, K. (2013, December 5). Age of distraction: Why its crucial for students to learn to focus. *KQED News*. Retrieved from <https://www.kqed.org/mindshift/32826/age-of-distraction-why-its-crucial-forstudents-to-learn-to-focus>

# STUDENTS WITH SPECIAL NEEDS MAY BENEFIT UNIQUELY FROM TECH

Just as there are no two children alike, there are no two children with special needs that respond exactly the same way to the same interventions. The complexity of a unique child's situation makes it impossible to make blanket statements on the use of technology for children with special needs. There are many cases in which technology can be truly transformative for this population. There is also good reason to be diligent in exploring non-tech options, but there are instances in which the tech option opens a world for a child who might not otherwise be able to access a portion of their education.<sup>86,87</sup> Studies show that assistive technology should be used with caution and not totally replace teacher-assisted lessons, though.<sup>88</sup> In all, "people may look at assistive technology as a tool that leads students with disabilities to succeed, while others believe assistive technology makes them dependent and students with disabilities will not be able to do the tasks on their own."<sup>89</sup> Taken collectively, technology for students with special needs can often be transformative, but isn't always.<sup>90</sup> EverySchool believes each special needs child should receive individual evaluations often and within the context of the teachers and experts available and the scope of their Individual Education Program (IEP).

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<sup>86</sup> Edyburn, D. (2006) Assistive technology and mild disabilities. *Special Education Technology Practice*, 8(4), 18-28. Retrieved from [https://www.researchgate.net/publication/242182934\\_Assistive\\_Technology\\_and\\_Mild\\_Disabilities](https://www.researchgate.net/publication/242182934_Assistive_Technology_and_Mild_Disabilities)

<sup>87</sup> Stauter, D., Prehn, J., Peters, M., Jeffries, L., Sylvester, L., Wang, H., & Dionne, C. (2019). Assistive technology for literacy in students with physical disabilities: A systematic review. *Journal of Special Education Technology*. <https://doi.org/10.1177/0162643419868259>

<sup>88</sup> Chebli, S., Lanovaz, M., & Dufour, M. (2019) Comparison of tablet-delivered and instructor-delivered teaching on receptive identification in children with autism spectrum disorders. *Journal of Special Education*, 34(1), 55-67. <https://doi.org/10.1177/0162643418781300>

<sup>89</sup> Ahmed, A. (2018). Perceptions of using assistive technology for students with disabilities in the classroom. *International Journal of Special Education*, 33(1), 129-139. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1184079.pdf>

<sup>90</sup> Maor, D., Currie, J., & Drewry, R. (2010). The effectiveness of assistive technologies for children with special needs: a review of research-based studies. *European Journal of Special Needs Education*, 26(3), 283-298. <https://doi.org/10.1080/08856257.2011.593821>

