Effects of Edtech on Learning

The drive to insert edtech into the nation's classrooms is driven more by corporate profit-seeking than by a true regard for students' learning and well-being. Tech companies and their backers, seeing a half trillion-dollar potential market, have flooded classrooms with low-cost hardware and computer-based learning programs and apps. School administrators, desperate for ways to improve test scores and eager to "keep up" with neighboring towns' tech spending, are an easy mark for edtech marketers that claim their products are the bold innovative solution for transforming schools from an "outdated," "factory" model, to one that will prepare students for 21st century jobs. And while the marketers come armed with self-produced studies proclaiming their products' effectiveness, long-term controlled studies have shown that the quantity and quality of student learning is similar, if not lower, in classrooms that rely heavily on computer technology.

(De-)Personalized Learning: Edtech is usually introduced into schools as a way to "personalize" learning, which, in theory, allows for student-centered instruction. The teacher takes a backseat and becomes a "guide on the side" while students explore at their own pace and choose learning methods that best fit their unique learning styles. The problem is that decisions about pacing and direction of instruction are being left in the hands of the children themselves. While a few older students might thrive in this setting, most flounder, and they miss the human interaction that catalyzes deep, conceptual understanding and higher-order thinking. Most troubling, "personalized" learning often becomes, in practice, the de-personalized practice of merely adjusting the difficulty level of prefabricated skills-based exercises based on students' test scores, which are generated regularly by computer software.

Edtech De-professionalizes Teaching: Robust curriculum, guided by and delivered with teachers' professional judgment, is replaced by incessant test preparation, effectively turning over decisions about pedagogy and content to commercial interests. There are many creative and rich ways to use technology in the classroom. However, each classroom teacher should be given the autonomy about when and how to utilize it.

Overuse of Screens for Non-school Purposes is a Problem for Both Teachers and Parents: Allowing digital devices into the classroom for note-taking and/or non-academic purposes has negative consequences for learning. As parents know and as research demonstrates, multitasking is a myth, and the distractions created by social media and gaming apps draw students' attention from instruction and reduce learning retention. Furthermore, excess screen use at home can result in anxiety, depression, and sleep deprivation, contributing to lower school achievement. Teachers can unwittingly contribute to home use of social media, video games, and other addictive apps by assigning homework online, undermining parents' efforts to limit and monitor children's screen time.

Countering the Counter-arguments:

They say: With much of the class being able to complete lessons on computers, the teacher can focus on those individuals and small groups that truly need assistance.

In fact: All students spend less time with teachers and more time interacting with screens, with the teacher's role changed into that of data collector and screen monitor.

They say: Students need to spend a lot of time on computers in order to be prepared for 21st century jobs.

In fact: Students' future success will depend on having gained basic skills in logical thinking, critical thinking, mathematics, reading, writing, and group work.

They say: Edtech meets children where they are, turning their love of digital games into an opportunity for learning.

In fact: Many digital curricula, especially for younger kids, offer virtual rewards that interrupt learning and teach students to complete assignments to get a prize, rather than helping to instill a love of learning. Gamification may contribute to student distraction and digital dependence.

Evidence from Recent Studies:

- A multi-country 2015 study by the Organization for Economic Co-operation and Development found that "students who used computers very frequently at school do a lot worse in most learning outcomes" (1).

- A 2019 study by the Reboot Foundation showed a negative connection between a nation's performance on international assessments and 15-year-olds' self-reported use of technology in school (2).

- A review of international research by investigators at MIT found that while some math programs do show promise, in general, student achievement doesn't rise when kids are using computers more, and it sometimes *decreases* (3).

- A 2009 study by the U.S. Department of Education found that the overall effect of edtech was "zero" and that in sixth grade math, students who used software got lower test scores – and the effect got significantly worse in the second year of use (4).

- In 2017, the generally tech-friendly Rand Corporation found "positive results in both mathematics and reading, but the achievement gains were modest, and statistically significant only in mathematics" (5).

- A meta-analysis of 1:1 programs by Missouri State University found "mixed or negligible effects in other areas of achievement like math, science, reading or social studies" (6).

- The Maine statewide 1:1 laptop program, after a decade and a half, and at a cost of $12 million annually, has yet to yield increases on statewide standardized test scores (7).

- Comprehension suffers when students read from digital devices, especially with nonfiction, according to a systematic review. Readers may be more efficient and aware of their performance when reading from paper compared to screens (8).

- A controlled Rutgers study showed cell phones in the classroom leading to distraction and lower retention (9).

- A study at the U.S. Military Academy showed negative effects in classrooms where laptops and tablets are permitted without restriction and in classrooms where students are only permitted to use tablets that must remain flat on the desk (10).

- A study, published in JAMA Pediatrics, found children get more sleep, do better in school, behave better, and see other health benefits when parents limit the content and amount of time their children spend on the computer or in front of the TV (11).

- Multitasking is a myth, according to Dr. Joann Deak, because the brain is only able to focus deeply on one task at a time. Further, trying to do too many things at once causes the brain to lose the capacity for deep thinking altogether (12).

- The common practice of teachers assigning homework online interferes with parents' efforts to monitor and limit their children's use of digital devices at home for non-school-related entertainment and social media (13).

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Further Reading and Resources:

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"[Has the Personalized Learning Hype Worn Off?]()" By Tim Walker, *NEA Today,* August 19, 2019.

"[Here's Why School Chromebooks Aren't All They're Cracked Up to Be]()." By Tim Cavanaugh, *Real Clear Investigations*, July 17, 2019.

"[The Messy Reality of Personalized Learning]()." By E. Tammy Kim, *The New Yorker*, July 10, 2019.

"[How I Lost the Screen-Time Battle with My Kids]()." By Joe Mathews, *San Francisco Chronicle*, May 5, 2019.

[The Digital Gap Between Poor Kids and Rich Kids is Not What We Expected](). By Nellie Bowles, *The New York Times*, October 26, 2018.

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