

EDUCATION WEEK

The Not-So-Simple Debate on Home Computers and Achievement

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A spate of recent news stories with attention-grabbing headlines like "Home Computers Hurt Students' Test Scores" may have many readers reaching the conclusion that a home computer is about as useful an educational aid as a PlayStation.

The media reports cite as evidence two research studies—one conducted in North Carolina by Duke University researchers Jacob L. Vigdor and Helen F. Ladd, and the other conducted in Romania by Ofer Malamud of the University of Chicago and Cristian Pop-Eleches of Columbia University. Each study indicates that home computers have a detrimental effect on student achievement, particularly among students from low-income households.

But before schools and parents dismiss the potential of the home computer as a learning tool, it's useful to step back and take a clear-eyed look at what these studies actually demonstrate, and what some other studies have to offer on this important topic.

The research in North Carolina and in Romania explored whether the presence of home technology, by itself, makes a difference in students' achievement. Both studies found that home computers did not produce better students (as measured by better test scores). Yet this conclusion is not surprising: We certainly don't assume that distributing violins will produce violinists, nor do we expect footballs, by themselves, to produce varsity quarterbacks.

The two of us believe that a far more fruitful area of inquiry would be this: Can a home computer be introduced in such a way that it will support a more effective home-learning environment and, in turn, improve academic achievement?

This is a question that has been explored by the Texas Education Agency, through its Technology Immersion Pilot, and the nonprofit group Computers for Youth. Evaluations of programs run by these organizations suggest that home computers can in fact produce better students and improve test scores. But before reviewing those results, it's worth discussing an even more basic question about student learning.

When we two first met in 2008, Ray had just written an article for *Slate* about the Romania study in which he, too, was guilty of drawing broad conclusions on the value of home computing. After reading it, Elisabeth, the chief executive officer of Computers for Youth,

suggested a meeting. Our discussions focused not on the past failures of unstructured home-computing interventions, but on the potential for technology to complement both classroom education and the efforts of parents to support learning in the home.

Ray reached out to education academics on this topic, and they echoed Elisabeth's view that children's learning at home—including their parents' fostering of self-directed learning—is strongly associated with success at school and college-readiness. Examples of this research include a longitudinal study of 3,100 students that found the home-learning environment to be one of the strongest predictors of reading and math achievement for 10- and 11-year-olds; and a literature review of parental-involvement studies showing that parents' engagement in their children's learning at home has an even greater effect on achievement than school itself.

If the home-learning environment has as much impact as schooling, one might reasonably ask why it gets so little attention. In large part, this is because past home-based interventions have had such limited success in raising test scores in a cost-effective way. They have generally been too expensive, too low-impact, or both.

But the ongoing computer revolution now allows us to deliver cheaper yet more sophisticated home-learning tools than were available even a few years ago, offering a low-cost way for students to apply what they've learned in the classroom after the school day ends. The advances also allow parents, who may have good intentions but little academic training, the chance to become more involved in the learning process. Given the surge in software innovation, the technology to do this effectively has already arrived—and is improving by the day.

Technology won't do the job alone, though. For technology in the home to have an impact, it needs to be complemented by the two C's: content and context. A computer is merely a delivery vehicle for content, such as the amazing breadth of information available on the Web, or the fascinating simulation games that encourage students to apply their math skills to, say, building an amusement park, or let them experience the life of a citizen of another country.

Whether proper content will make a difference for student learning depends on the context: how students, parents, and teachers interact with each other and the technology. Programs that have been successful address content and context through wraparound programming: Students receive the hardware and the educational software they need to learn, and teachers and parents receive the training they need to support that learning.

The Texas Technology Immersion Pilot and the Computers for Youth program are promising case studies for using wraparound programming to fulfill the home's potential in helping students learn.

The Texas pilot, a public/private partnership, was rolled out in 21 schools across the state. Teachers were given professional development, and both teachers and students received laptop computers that included productivity, communications, and presentation software, plus online instructional resources supporting the state curriculum in core subjects. The results, according to a study by the Texas Center for Educational Research: Half the

student cohorts examined showed statistically significant gains in reading and math, with effect sizes of 8 percent of a standard deviation for reading, and 16 percent to 20 percent for math. The math effect sizes were particularly noteworthy, being similar in size to those cited in studies examining Head Start, Teach For America, and improvement programs in teacher quality. The other cohorts also showed gains, albeit not statistically significant ones.

The study also found that the strongest predictor of student' reading and math scores was the amount of time they used their computers outside of school for homework or for learning games.

Similarly, Computers for Youth, or CFY, has partnered with schools in low-income communities, offering its program to all 6th graders in a school, year after year. Families receive a free computer designed as a home-learning center and participate in an intensive training workshop offered in both English and Spanish. The home-learning center is broadband-ready and includes software that's been carefully selected to be both engaging and educational. Teachers at partner schools receive training on how to connect classroom learning with what is now a fortified home-learning environment.

CFY has served more than 23,000 families to date in five regions, and extends its efforts via an affiliate network of organizations in more than 20 states. A study of the program, done in partnership with the Educational Testing Service, found a positive and statistically significant impact on the math-test scores of low-income middle school students. In part because of these promising results, the organization was recently awarded \$23 million from the federal Broadband Technology Opportunities Program to bring its program to scale, serving 33,000 additional families over the next two years.

While the importance of the home-learning environment remains unquestioned, past innovations in this area haven't managed to budge the needle on student performance. Yet the recent experiences of these and other programs, combined with continuing advances in technology, should inspire educators and policymakers to explore anew the promise of leveraging home learning to improve student achievement.

We owe it to ourselves to go beyond simple talking points and long-held assumptions to tackle this area of learning that holds so much promise for helping students reach their full potential, in school and beyond.

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