The Positive Financial Impact of Technology-Transformed Schools

Just one of many benefits of educational technology discussed in

Revolutionizing Education through Technology

The Project RED Roadmap for Transformation

By **Thomas W. Greaves, Jeanne Hayes, Leslie Wilson, Michael Gielniak,** and **Eric L. Peterson**

Foreword by **Angus King**

iste®

Publication of this book was made possible in part by the generous support of Intel.

The Technology Factor

K–12 education expenditures have increased at over twice the rate of inflation from 1965 to 2005, yet U.S. school districts continue to deal with the problems of disengaged students and low achievement.

Education leaders and policymakers are looking for ways to improve the quality of outcomes while slowing the growth of expenditures. The positive financial impact of properly implemented educational technology can contribute substantially to the solution. Read on to find out more!

Online Formative Assessments

Online formative assessments have financial advantages, but more importantly, they provide valuable real-time feedback to both teachers and students regarding student performance levels.

Current Costs

- Test printing costs 3 to 4 cents a page. Tests run from 1 to 10 pages, and students often take 1 test a month in each of five classes, or 50 tests a year. At nine pages a test and 3 cents a page, the cost is $13.50 per student per year.
- Manual scoring takes one to three minutes per multiple-choice test. If teacher time is worth 30 cents to 60 cents per minute, the cost is roughly 30 cents to $2 per test, including recording in the grade book, returning tests, etc. Assuming 50 tests a year and 50 cents a test, the cost is $25 per student per year.

Benefits/Savings

- Reduced paper and printing costs for exam booklets.
- Reduced teacher time spent on scoring. If scanner scoring is used, the cost can be cut in half, to $12.50 per student per year.
- Second-order changes:
  - Shorter test times
  - More time for instruction
  - Easier tailoring to class circumstances
  - More frequent tests for ongoing feedback
  - More teachable moments based on immediate feedback
  - Automatic essay grading

Irving Independent School District, Texas

An ambitious online formative assessment program is replacing traditional paper and pencil testing at Irving ISD. Teachers use the new system three to seven times per year in English language arts, math, science, and social studies in Grades 3–12. The licensing fee for the online package plus upgrades is $621,000 for three years, or $207,000 per year.

Paper and Pencil Formative Assessment Printing Cost Estimate per Year*

Cost Variables	Total
Students taking assessments	26,000
Number of assessments (dependent on grade)	3–7
Number of assessments per date	4
Total pages per assessment	11
Total pages printed	8,211,000
Total printing cost per year	$328,000

**All data is a "good faith" estimate provided by the district.*

Paper and Pencil versus Online Formative Assessment Cost Based on Nine Assessments per Year

Cost Variables	Total
Printing cost per year	$328,000
License fee per year	$207,000
Online formative assessment cost savings per year	$121,000
Online formative assessment cost savings per student per year	$5 (35% savings)

Disciplinary Actions

The frequency of disciplinary actions is a strong, leading indicator of academic success or failure. Fewer disciplinary actions mean that students are more likely to be engaged in learning. Also, every disciplinary action costs time and money.

- Disciplinary actions reduce instructional time and affect outcomes for all students.
- Serious issues require police intervention. The cost to the taxpayer of a police visit is $100 or more.
- Some schools need full-time police presence or contracted security guards at a cost of approximately $50 per student per year.
- Suspensions frequently result in legal fees. One school district reported $250,000 in legal fees for a case that went to trial.

Parks Middle School, Atlanta, Georgia

In 2001, Parks Middle School logged an average of three police actions a day. In 2002, the school launched a 1-to-1 laptop program supported by key implementation factors, such as intervention classes, online formative and summative assessments, games and simulations, teacher professional learning enabled by the principal, and change management led by the principal.

In 2003, the number of police actions dropped to three for the entire year. In addition, the percentage of eighth grade students passing the state GCRT math exam jumped from 19% to 43%, and the writing test gap closed by 19%, compared with the rest of the state.

Digital Instructional Materials

If schools move to digital instructional materials, the cost of copying blackline masters is reduced. Schools can also see which materials are actually used, by whom, and when. And they can adjust purchasing requests to minimize costs. Best of all, instructional materials usage can be tied to student performance over large sample sizes, insight can be gained into what works for which populations, and the most effective materials can be automatically deployed on a student-by-student basis.

Learning what works for specific populations can dramatically reduce the cost of remediation by personalizing instruction. If schools know what works, they purchase redundant products and services less often.

Empire High School, Vail, Arizona

Empire High School is the first high school in America designed from the ground up to be all digital. Many schools across the country have replicated the experience of this school in whole or in part.

After the district provided the framework and posted the standards, teachers and the district began linking digital resources to the posted pages. This allowed teachers to produce their own current content related to the standards (instead of textbooks), using just-in-time production and peer review. Less than 1% of all teacher-submitted projects were removed due to lack of quality. District Chief Information Officer (CIO) Matt Federoff noted that teachers were becoming producers of knowledge and content, which allowed them to personalize teaching and learning.

The cost of teacher time to develop digital content, while not insignificant, is similar to that of their previous work of aligning analog content with state and district standards but with greater benefits.

Digital Content Costs (Core + Supplemental)

	Total
Annual instructional materials cost per student 2006–2007	$51
Annual instructional materials cost per student 2008–2009	$9
Online formative assessment cost savings per student per year	$42 (82% savings)

Blended Learning

In blended learning, students spend part of their time in class face-to-face with the teacher and part of their time pursuing online courses or learning experiences. Recent research from the U.S. Department of Education shows that students prefer a blend of online and face-to-face instruction.

Blended learning works best when each student has a personal, portable technology device, and real transformation occurs when teachers base instructional practice on digital resources and digitally organized materials. For example, once a teacher has organized regular classroom instruction onto Moodle or other learning management systems—and students have adjusted to connecting with instruction in that manner—the transition to online or blended learning is comparatively easy.

Walled Lake High School, Michigan

Walled Lake High School, a high-achieving suburban school near Detroit, wanted to maintain academic excellence while saving money in light of the state's economic downturn. Superintendent William Hamilton chose to address these two goals by integrating online coursework on a large scale within the traditional brick and mortar district. His analysis showed that the cost per student per course went from $900 to $383, a savings of 57%. Instruction has become highly individualized, and students are progressing more rapidly because of the faster feedback process and the extended time for learning.

Face-to-Face versus Online Courses

	Total
Incremental cost per student per year, two face-to-face courses per semester	$900*
Digital cost per student per year, including teacher support	$383**
Digital per student per year cost savings, two online courses per semester	$517 (57% savings)***

**Based on 300 students at a 33:1 staffing ratio, including teacher salaries and benefits.*

***Based on 300 students at a 150:1 staffing ratio, including teacher salaries and benefits and software license fee.*

****Textbook and supply allocations have not been included, because at this time the district has not experienced reductions in these costs.*

Professional Learning

Teachers must continually hone their ability to create and improve the 21st century computer-enhanced learning environment. Professional learning is essential for their growth in effectively integrating education technology. Commitment and high expectations lead to increased student success. Recent U.S. Department of Education research shows that the most effective instructional platform is a combination of face-to-face and online learning. And since schools have continual budget constraints, moving a large portion of the professional learning program to an online format makes economic sense.

ASCD and McREL

The Association for Supervision and Curriculum Development (ASCD) is a membership organization that provides high-quality, self-paced online professional learning. Adult learners engage in a cycle of new learning, reflective practice, and discussion, with access to an online forum. The courses must be completed within six months and cost $99 dollars per teacher per course.

The Mid-continent Research for Education and Learning (McREL) is a nationally recognized organization that offers face-to-face professional learning of a similar caliber, conducted by well-known leaders, researchers, teachers, and writers. The cost of a two-day symposium for 40 participants is $7,000. When travel expenses are added, estimated at $1,300, the per-person cost is $207.50.

Online Professional Learning versus Face-to-Face Costs (ASCD and McREL Models)

	Total
Face-to-face cost per teacher per course (McREL)	$208
Online cost per teacher per course (ASCD)	$99
Online cost savings per teacher per course	$109 (52% savings)

Help Revolutionize Education!

We named our national research and advocacy plan Project RED (Revolutionizing Education) because we believe there is a need to revolutionize the way the United States looks at technology as part of teaching and learning. We believe that technology can help us reengineer our educational system. Through the efforts of Project RED and our partners we believe that technology will transform learning, just as it has transformed homes and offices in almost every other segment of our society.

We can use your help. Share your stories about the ways you have experienced technology integration making an impact in education. Email us at info@ProjectRED.org, call 1-877-635-4198, or visit iste.org/projectred.

Effective technology implementation in schools leads to significantly higher student achievement and positive financial impact.
That is a bold statement, but one with the backing of Project RED.

Project RED has concluded that properly implemented educational technology, especially 1-to-1 programs where technology is continuously accessible, substantially improves student achievement and can be revenue positive at the local, state, and federal levels. The key is successful integration that brings about transformational change.

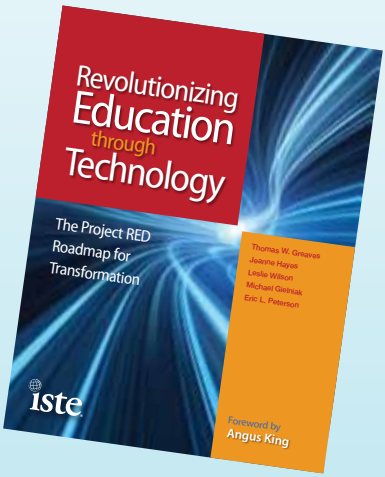
Read more in

Revolutionizing Education through Technology

The Project RED Roadmap for Transformation

By Thomas W. Greaves, Jeanne Hayes, Leslie Wilson, Michael Gielniak, and Eric L. Peterson

Foreword by Angus King



Examples in this booklet are excerpted from and copyright Greaves, T.; Hayes, J.; Wilson, L.; Gielniak, M.; & Peterson, R., The Technology Factor: Nine Keys to Student Achievement and Cost-Effectiveness, MDR 2010.

iste.org/prored

iste® International Society for Technology in Education

www.iste.org