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Project RED:
The Technology Factor

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www.projectred.org

Project RED
REVOLUTIONIZING EDUCATION

The Project RED Team

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The Project RED Mission

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Research three major issues related to U.S. education:

- **Improving student achievement**

  Unlike other segments, public education has seen only isolated benefits attributable to technology. Project RED seeks to define technology models that lead to improved student achievement.

- **Evaluating the financial impact of technology on budgets**

  Little work has been done to show the positive financial Impact of educational technology. Project RED identifies cost savings, cost avoidance, and revenue enhancements.

- **Assessing the impact of continuous access to a computing device by every student**

  Does Continuous access increase education outcomes? What conditions are necessary to lead to increased academic achievement and financial benefits? What are best practices regarding technology?

Unprecedented Scope

Unique scope, breadth, and depth:

- 997 schools, representative of the U.S. school universe
- 11 diverse Education Success Measures (ESMs)
- 136 independent variables in 22 categories
- Comparison of findings by student/computer ratios (1:1, 2:1, 3:1, 4:1, or more)
- Comprehensive demographic data correlated to survey results

Education Success Measures (ESMs)

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What are the outcomes we wish to improve?

All Schools

1. *Fewer* disciplinary actions
2. *Lower* dropout rates
3. *Less* paperwork
4. *Lower* paper and copying expenses
5. *Higher* teacher attendance
6. *Higher* test scores

High Schools

7. *Higher* AP course enrollment
8. *Higher* college attendance plans
9. *Higher* course completion rates
10. *Higher* dual/joint enrollment in college
11. *Higher* graduation rates

Key Implementation Factors (KIFs)

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Which technology practices improve learning the most?
(rank order of predictive strength)

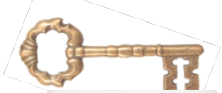
Technology Integration in intervention classes

Principal training in 2nd order change

Change management leadership by principal

Online collaboration

Technology integration in core subjects



Online formative assessments

Student/computer ratio

Virtual field trips

Search engines

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Key Finding 1

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Nine key implementation factors are linked most strongly to education success.

Schools are in a technology implementation crisis. While education technology best practices have a significant positive impact, they are not widely and consistently practiced.

- Very few schools implement technology properly despite knowing that technology improves learning only when deployed frequently in appropriate learning environments.
- Very few schools implement most of the key implementation factors (KIFs) despite previous large investments in infrastructure and hardware.

Key Implementation Factors
Few Schools Deploy Many

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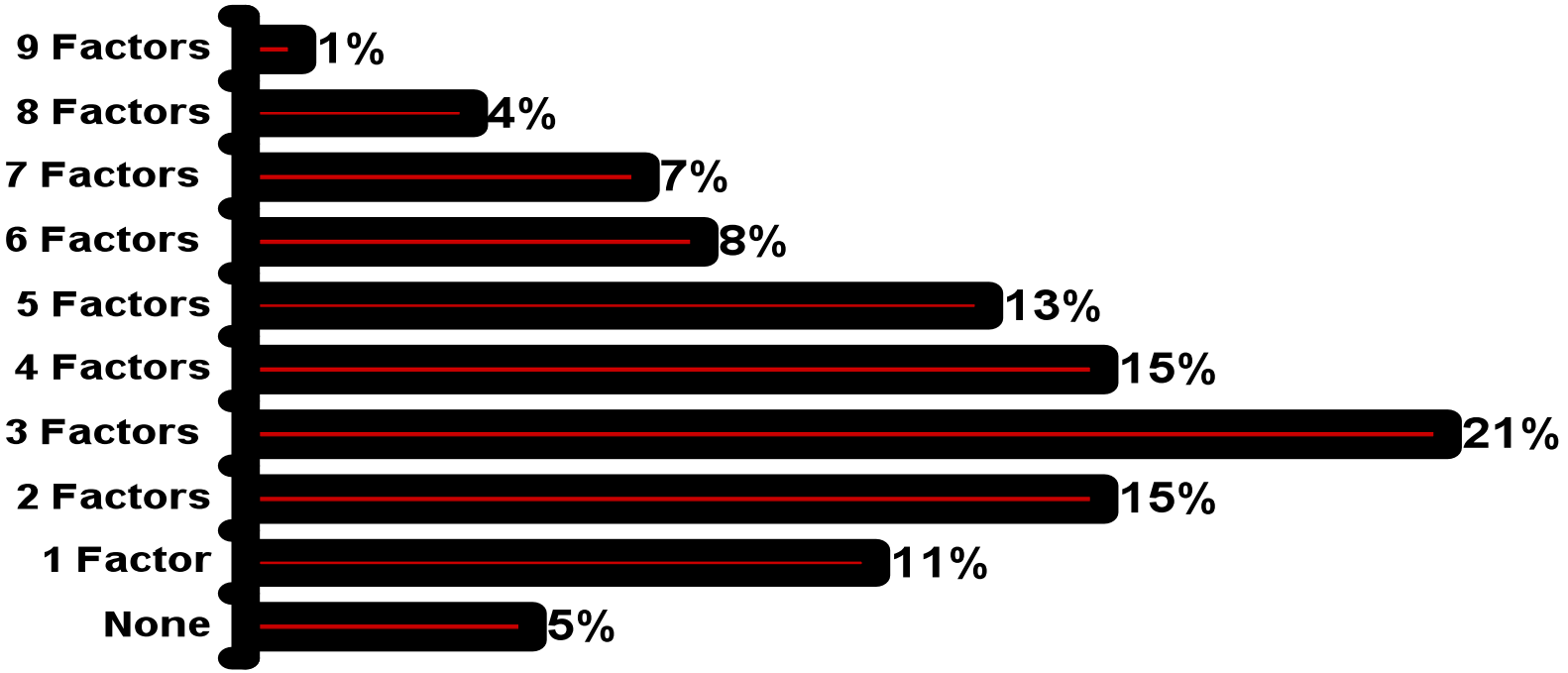

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Key Finding 2

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Properly implemented technology saves money.

- Most discussions focus on the high costs of technology, not the potential for savings.
- Project RED shows that properly implemented technology can provide immediate short-term savings at all levels.
- For example, LMS features can reduce copy machine and bubble sheet expenses (through the switch to online formative assessment).
- To the extent that school systems are willing to change practices and states are willing to change policy, the savings can grow substantially over time.
- For example, longer-term state-level savings can come from reduced dropouts and dual/joint enrollment.

The projected savings in 13 areas average $448/student/year.

1:1 Schools Have Greater Savings

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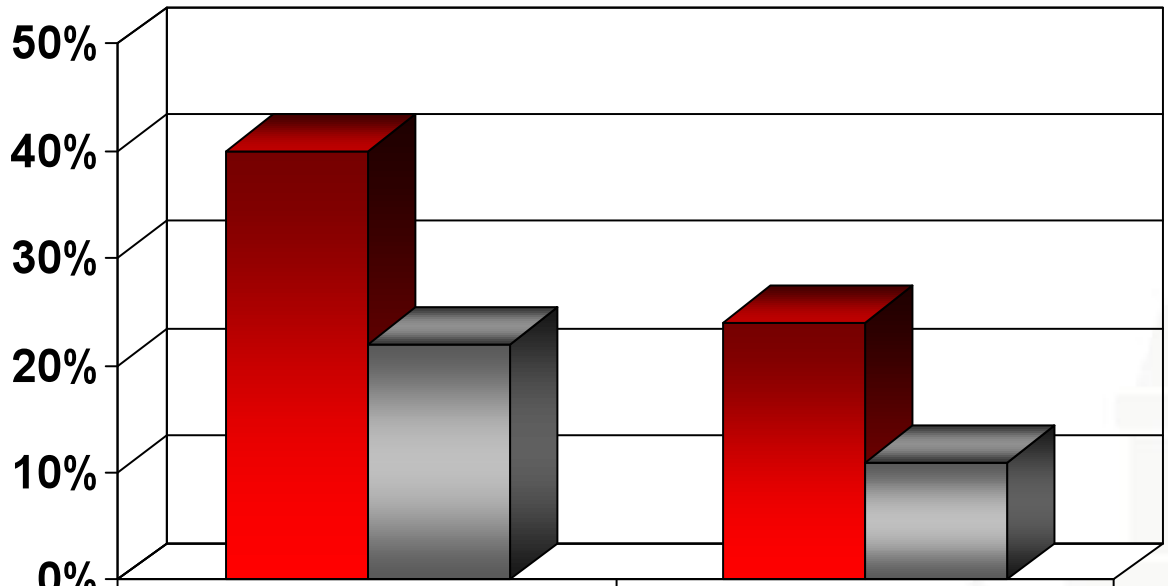
Pct. of Respondents



	Paperwork Reduction	Copy Machine Expense Reduction
1:1 Schools	40%	24%
All Other Schools	22%	11%

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Key Finding 3

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1:1 schools employing key implementation factors outperform all schools and all 1:1 schools.

A 1:1 student/computer ratio has a higher impact on student outcomes and financial benefits than other ratios, and the key implementation factors (KIFs) increase both benefits.

- In general, schools with a 1:1 student/computer ratio outperform non-1:1 schools on both academic and financial measures. The lower the student/computer ratio, the better the student outcomes.

- Performance of all schools can be improved by adherence to known best practices. The chart on the next slide illustrates the positive impact of the Top Four of our key technology implementation factors:

Technology is deployed:
- Intervention Classes Every Period
- Principal Leads Change management
- Online collaboration Daily
- Core Curriculum weekly

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1:1 Works When Properly Implemented

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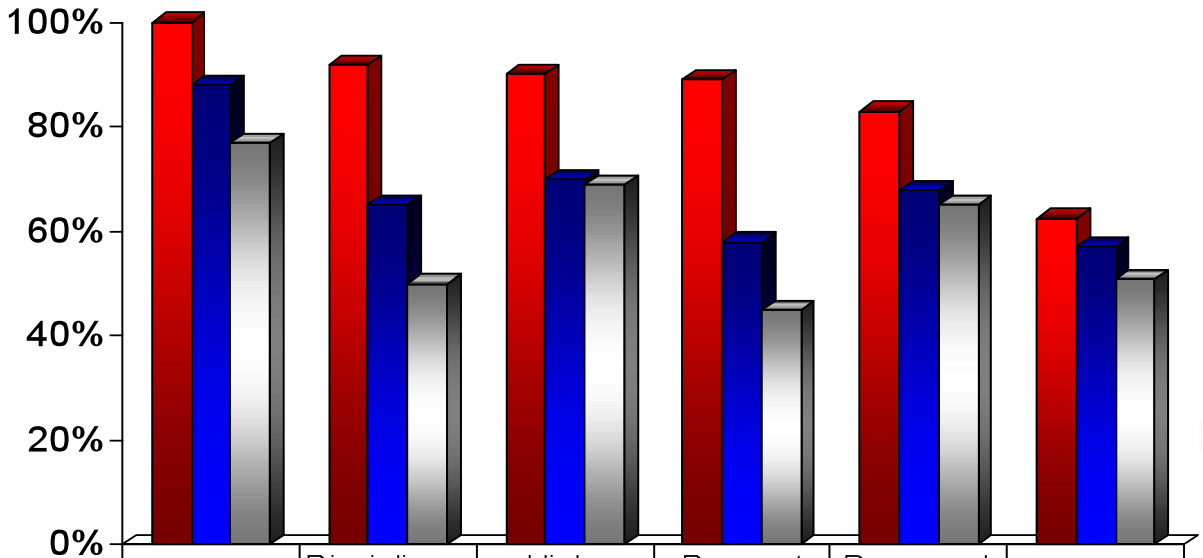
Pct. of Respondents
Reporting Improvement



	Paperwork Reduction	Disciplinary action reduction	High-stakes test scores	Drop-out rate reduction	Paper and Copy Machine	Graduation Rates
Proper 1:1*	100%	92%	90%	89%	83%	63%
All 1:1	88%	65%	70%	58%	68%	57%
All Other Schools	77%	50%	69%	45%	65%	51%

•Proper 1:1: Those schools practicing the top 4 Key Implementation Factors (13 schools) Rev.
Intervention Classes Every Period, Principal Leads Change management, Online collaboration Daily, Core Curriculum weekly

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Key Finding 4

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The principal's ability to lead change is critical.

- The impact of a good principal has been widely documented. Project RED shows that the principal is the single most important variable across many of the 11 ESMs.
- Change management training for principals involved in large-scale technology implementations is of paramount importance.
- All schools benefit from technology, with more benefits in 1:1 schools.
- When principals receive specialized training and technology is properly implemented, the benefits increase even more.
- The goal is systemic change, not dependent on an individual, so collaboration at all levels from supt. and school board to classrooms is key.

Reduction in Disciplinary Actions

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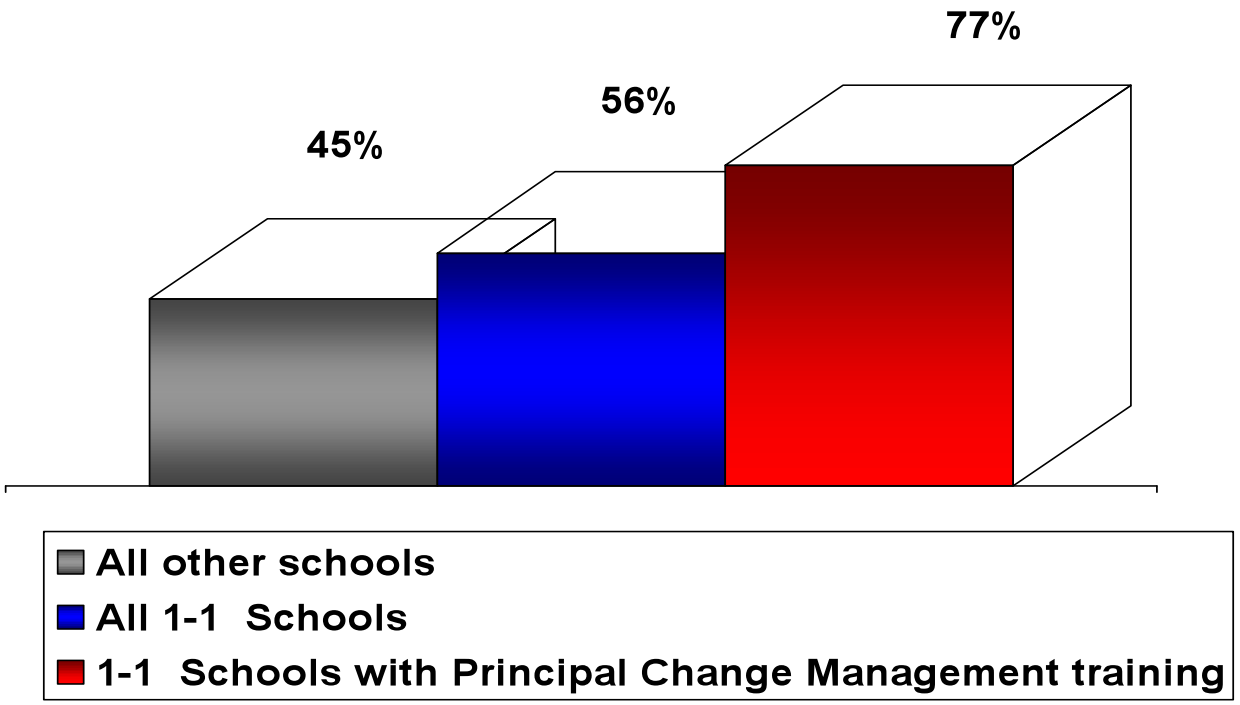
Pct. of Respondents



Improving Dropout Rates

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Key Model Predictors

Factor	Description	Relative Importance
13	Intervention classes - Technology integrated into every class period	29.4
9	Principal enabling Professional Learning, Collaboration and leading Change Management	23.4
5	Core Subjects: Technology integrated into curriculum at least weekly	17.2
17	Virtual Field Trips Occur (and effect strengthens with frequency)	15.0
Ratio	1:1 Student to Computing Device ratio	8.4
6	Principal trained in Teacher Buy-in, Best Practices and Technology-transformed Classroom	6.8

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Key Finding 5

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Technology-transformed Intervention improves learning.

- Technology-transformed interventions (ELL, Title I, special ed and reading intervention) are the top-model predictor of improved high stakes test scores, dropout rate reduction, and improved discipline.
- The only other top-model predictor for more than one ESM is the student/computer ratio, with lower ratios (1:1) being preferable.
- A student-centric approach enabled by technology allows students to work at their own pace and teachers to spend more time with individual students and small groups.

Improving Test Scores

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Key Model Predictors

Factor	Description	Relative Importance
13	Intervention classes - Technology integrated into every class period	28.0
9	Principal enabling Professional Learning, Collaboration and leading Change Management	21.9
19	Online Formative and Summative Assessment frequency	19.2
5	Core Subjects: Technology integrated into curriculum at least weekly	12.8
18	Online Collaboration (Games/Simulations and Social Media) – Students utilizing technology daily	11.2
Ratio	1:1 Student to Computing Device ratio	7.0

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Key Finding 6

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Online collaboration increases learning productivity and student engagement.

- Web 2.0 social media substantially enhance collaboration productivity, erasing the barriers of time, distance, and money.
- Collaboration can now extend beyond the immediate circle of friends to include mentors, tutors, and experts worldwide.
- Real-time collaboration increases student engagement, one of the critical factors for student success.
- One result of increased engagement and buy-in is a reduction in disciplinary actions.
- Online discussion boards and tutoring programs can extend the school day and connectivity among learners and teachers.

Improving Discipline

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Key Model Predictors

Factor	Description	Relative Importance
18	Online Collaboration (Games/Simulations and Social Media) - Students utilizing technology daily	35.2
13	Intervention classes - Technology integrated into every class period	24.8
19	Online Formative and Summative Assessment frequency	14.1
9	Principal enabling Teacher Professional Learning, Collaboration and leading Change Management	13.5
Ratio	1:1 Student to Computing Device ratio	12.3

Key Finding 7

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Daily use of technology delivers the best return on investment (ROI).

- The daily use of technology in core classes correlates highly to the ESMs.
- Daily technology use is one of the top five indicators of better discipline, better attendance, and increased college attendance.
- In 1:1 schools, daily use in core curriculum classes ranges from 57% to 62%.
- Unfortunately, many schools report using technology only weekly or less frequently for many classes.

Use of Digital Content in 1:1 Schools

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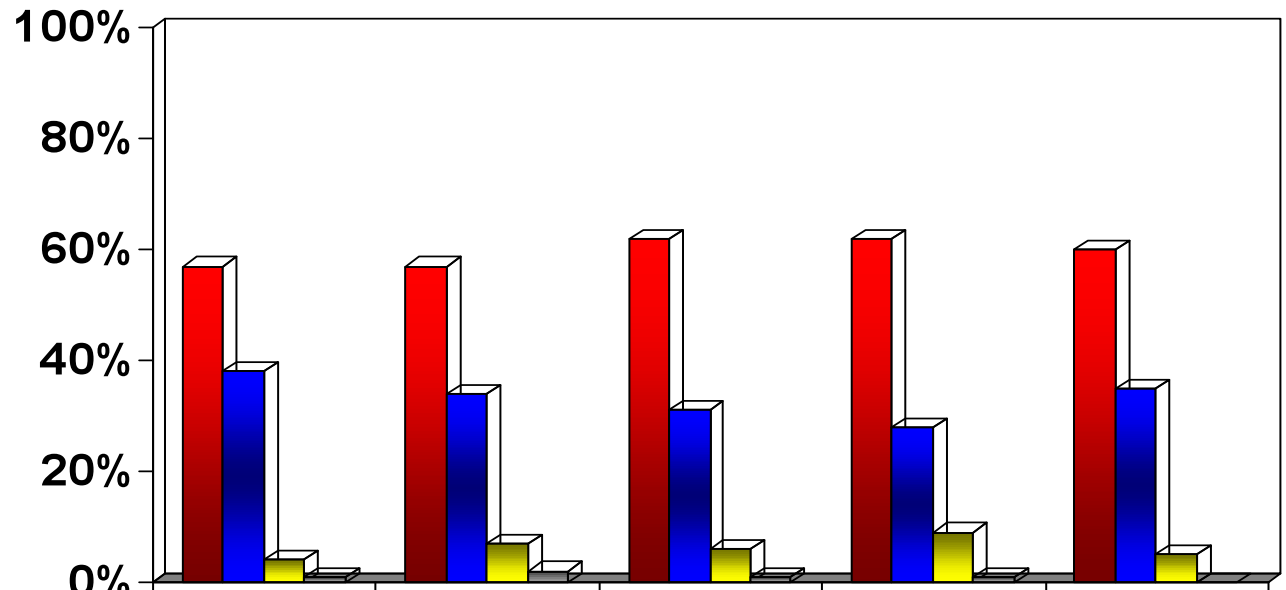
Pct. of 1:1 Respondents



	Reading	Math	Science	Social Studies	English/Language Arts
Daily Use	57%	57%	62%	62%	60%
Weekly	38%	34%	31%	28%	35%
Monthly	4%	7%	6%	9%	5%
Not At All	1%	2%	1%	1%	0%

Improving Graduation Rates

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Key Model Predictors

Factor	Description	Relative Importance
13	Intervention classes – Technology integrated into every class period	25.7
5	Core Subjects: Technology integrated into curriculum at least weekly	22.2
9	Principal enabling Professional Learning, Collaboration and leading Change Management	15.4
19	Online Formative and Summative Assessment frequency	14.3
32	Search Engines: Students using daily	13.4
18	Online Collaboration (Games/Simulations and Social Media) - Students utilizing technology daily	10.9
Ratio	1:1 Student to Computing Device ratio	6.9

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Savings due to Technology

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Improving our children's learning is essential.

Figuring out how to pay for it is the challenge.

Schools using technology properly in learning provide a model that could save $448 per student per year

Financial Impact Per Year - $25B

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Category	National Impact	Per Student
Student Data Mapping	$605,000,000	$11
Online Professional Learning	$654,000,000	$12
Teacher attendance increase	$718,200,000	$13
Power savings	$861,666,667	$16
Digital core curriculum savings	$935,000,000	$17
Disciplinary action reduction	$1,100,000,000	$20
Post-secondary remedial education	$1,660,000,000	$30
Digital supplemental materials vs. print	$1,700,000,000	$31
Copy machine cost calculations	$2,200,000,000	$40
Online assessment savings	$2,392,500,000	$44
AP/dual course enrollment	$3,180,343,000	$58
Paperwork reduction	$3,300,000,000	$60
End of course failure	$5,865,200,000	$107
Total Per Student excluding Dropout Savings	**$25,171,909,667**	**$448**

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Total Cost of Ownership

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Average TCO per student, per year

1:1	$593
Current tech expenditures	$298
Difference	$295
Potential 1:1 Savings	$448
Potential net savings @ 1:1	$153

Cost of Dropouts

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- Nationally, 25% of all students drop out, roughly a million students a year,[1] and the average dropout fails at least six classes before dropping out.[2] Given an average cost per class of $1,333, the direct avoidable cost is approximately $8,000.[3]

- The human cost is incalculable and can span generations.

1 NCES, *Public School Graduates and Dropouts*, 2010
2 Project RED estimate
3 National expenditure per pupil $9,145 U.S. Dept. of Education

Dropout Reduction Benefits

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- The number of Project RED schools reporting a reduction in dropouts due to technology jumps to 89% when key implementation factors (KIFs) are employed.

- A student who graduates from high school generates $166,000 to $353,000 in increased tax revenues compared with a dropout over a career of 40 years.

- A student who graduates from high school and then graduates from college generates $448,000 to $874,000 in increased tax revenues compared with a dropout over a career of 40 years.

The Biggest Financial Impact…

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Dropout Rate Reduction: $3.121 Trillion

- Dropouts have the highest financial impact of any of the variables discussed in this report.

- Students who complete high school and go on to college have substantially increased earning power and consequently pay more taxes.

- The increased tax revenue continues throughout their careers.

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