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By Angus King, Governor of Maine, 1995–2003 xv

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INTRODUCTION

Project RED: An Education Revolution

We are Project RED! What is Project RED? We conducted a national survey to analyze what's working in technology-transformed schools and to show how technology can save money when properly implemented.

- We researched more than a thousand schools that provide access to the Internet for every student. We asked them what factors contributed to the success or failure of their programs.
- We're looking for other technology-transformed schools that we may have overlooked so we can have the most complete database ever assembled from which to learn.
- We're also searching for proof of cost savings from the implementation of technology in any K–12 environment, whether these savings come from online learning courses, professional development, concurrent enrollment in college courses, data mapping, special needs programs, or any other program.

We learned (and are continuing to learn) many important things from our work on Project RED, and we'll discuss them in chapters to come, but there are three key insights we want you to embrace. These insights are invaluable to leaders planning to implement ubiquitous technology in schools, and we'll return to them again and again:

- Properly implemented educational technology can substantially improve student achievement.
- Properly implemented educational technology can be revenue positive at all levels—national, state, and local.
- Continuous access to a computing device for every student leads to increased academic achievement and financial benefits, especially when technology is properly implemented.

We hope this book will convince you of the truth of these insights. An education revolution will happen only with the support of leadership. You, as an educational

leader, must break the trail. Real change requires that every segment of the educational community commit to the change and then follow through.

Goals of Project RED

Although data gathered over the years have indicated that technology has not achieved the same impact in education as in other sectors of the economy, it has become clear that a few pockets of excellence are successfully transforming schools with technology using specific implementation strategies. The urgent need to understand those successful implementation strategies provided the impetus for Project RED.

America's Digital Schools 2008 (Greaves & Hayes, 2008) had revealed that only 33% of school districts with 1-to-1 schools considered their academic improvement due to technology to be significant: the Project RED team saw this as an opportunity to identify the strategies behind those improvements and provide guidelines for other schools. This became the first goal of the survey.

In *The Price We Pay: Economic and Social Consequences of Inadequate Education*, the authors pointed out the connections between education and the economy (Belfield & Levin, 2007), so Project RED established a second goal: to research the potentially positive financial impact of technology in schools. Surprisingly, unlike in the private sector, very little research has been done on the financial impact of technology in education.

Because debate in recent years has questioned whether students perform better when they have continuous access to a computing device, Project RED established a third goal: to examine the impact of 1-to-1 computing on student performance and education budgets.

Many studies, including earlier research by the authors, have addressed district-level activities and the importance of district-level leadership. However, Project RED deliberately adopted a school-level focus in order to observe principal, student, and teacher behaviors as closely as possible; correlate student performance to school-level activities; and ensure that school-to-school implementation variances did not mask correlations to student performance.

Scope

Many surveys and studies have examined the impact of educational technology. Unfortunately, most have covered only one school or a few schools, and the study interest areas have covered only a sparse matrix. Project RED provides unprecedented scope, breadth, and depth:

- 997 schools, representative of the U.S. school universe, and 49 states and the District of Columbia
- 11 diverse education success measures
- 22 categories of independent variables, with many subcategories
- Comparison of findings by student–computer ratios (1-to-1, 2-to-1, 3-to-1, etc.)
- Comprehensive demographic data correlated to survey results

Given the array of factors and variables, a variety of analysis techniques were required, including regression analysis, principal component analysis, and predictive modeling (see www.projectred.org for more information on our methodology). The survey has been augmented by interviews and additional information, generously provided by school and district administrators.

Project RED’s findings and recommendations will assist four groups—legislatures, federal and state agencies, school districts, and industry—in remaking the American education system and re-engineering our schools. Our findings will give you the information you need to be confident as you make critical decisions.

Legislatures. Education is one of the largest budget items for every state. Project RED will introduce legislatures to the cost savings and return on investment (ROI) that result from effective technology implementation as part of education reform. Project RED’s findings can also help support legislative action that removes barriers to new educational practices.

Federal and state agencies. Groups such as the National Governors Association, the Council of Chief State School Officers, and other education leadership associations (many of whom supported Project RED’s research), are interested in understanding the cost savings and increased student achievement associated with effective technology initiatives. Project RED will help these groups identify an action agenda they can share with their memberships.

School districts. Superintendents are under pressure from a variety of sources to improve outcomes while doing more with less funding. Properly implemented technology initiatives have a positive impact on Education Success Measures (ESM) and save money over the long run. The models and strategies provided by Project RED can be helpful to these leaders when implementing technology.

Industry. Publishers and producers of hardware, software, and infrastructure products and services must understand trends and differences among various segments in the education market. This understanding allows business leaders to best address American education needs for the 21st century.

The goal of this book is to empower education leaders, policy makers, and industry to effect meaningful change in American schools. To effect this change, each stakeholder group must have a shared vision that transcends mandate, function, or official capacity. Project RED's findings provide the foundation for this shared vision.

For more about Project RED—who we are and what we do—see Appendix A or visit the Project RED website (www.projectred.org).

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CHAPTER 1



First- and Second-Order Change

In early 2009, all indicators pointed to a perfect storm on the horizon in the U.S. education system. Although the requirements for student achievement had been increasing, student performance remained essentially flat, despite the fact that education spending had increased at more than twice the rate of inflation between 1965 and 2005. In addition, the advent of the Internet had widened the gap between the requirements for student achievement and actual student performance to an unacceptable degree. The implosion of the economy created an additional storm front, and it appeared that the financial picture for schools was unlikely to improve for decades, if at all. The U.S. Department of Education was explicit about future education funding. “Plan on doing more with less” was the order of the day. A radical response is needed to address this situation.

However, in today’s educational landscape, very little effort is directed toward radical improvements, where students learn at twice the rate and half the cost, for example, as outlined in the fourth grand challenge of the 2010 National Educational Technology Plan.

*The Project RED team estimates that first-order educational change yields savings of \$30 billion a year at best—while second-order change could yield savings of **\$100 billion a year or more** and significantly improve student performance.*

Project RED provides a radical response to the situation faced by U.S. schools today—a way for school districts and policy leaders to begin to address the grand challenge and navigate the perfect storm successfully using second-order change principles. Intrigued? Read on for a discussion of first-order and second-order change.

First-Order Change

Within the change cycle in any industry or endeavor, incremental first-order changes and intervening plateaus are generally followed by transformative second-order changes. What is the difference? A simple way to determine first-order change is by examining potential outcomes. If the proposed change does not have the potential to cause a twofold (or more) improvement, then that change can be safely classified as a first-order change. Almost all educational technology initiatives have been first-order changes. Even if these changes are well implemented, impact will always be limited.

First-order changes are reforms that assume that the existing organizational goals and structures are basically adequate and what needs to be done is to correct deficiencies in policies and practice. Engineers would label such changes as solutions to quality control problems.

For schools, such planned changes would include recruiting better teachers and administrators; raising salaries; distributing resources equitably; selecting better texts, materials, and supplies; and adding new or deleting old content and courses to and from the curriculum.

When such improvements occur, the results frequently appear to be fundamental changes or even appear to be changes in core activities, but actually these changes do little to alter basic school structures of how time and space are used or how students and teachers are organized and assigned.

First-order changes, then, try to make what exists more efficient and effective without disrupting basic organizational arrangements or how people perform their roles.

—Larry Cuban

The Managerial Imperative and the Practice of Leadership in Schools, 1988, pp. 228–229

Second-Order Change

Second-order change implies a fundamental or significant break with past and current practices. This type of change represents a dramatic difference in current practices. Second-order changes require new knowledge and skills for successful implementation. Project RED defines second-order change for our schools as follows:

- Student performance levels double, at a minimum.
- The change mechanism is broad scale and addresses all student populations.
- The changes are scalable to the largest educational entities.
- Changes are sustainable and can withstand the vagaries of the economy, teacher and staff turnover, and other factors.

Examples of second-order change in schools are as follows:

- Mechanisms in place to address each student with personalized instruction programs.
- Exchange of seat-time requirements for demonstrated proficiency in coursework.
- Change in focus to student as customer.

Second-order change is extremely difficult to achieve, but the results are game-changing. Project RED data illustrate that substantial improvements in academic-success measures and financial return on investment (ROI) are tied to second-order changes, wherein the re-engineering of schools is facilitated by the judicious use of ubiquitous technology. Interestingly, Project RED data indicate that it may actually be impossible to achieve second-order change in schools with a student-computer ratio higher than one student per computer (1-to-1).

Second-order changes, on the other hand, aim at altering the fundamental ways of achieving organizational goals because of major dissatisfaction with current arrangements. Second-order changes introduce new goals and interventions that transform the familiar way of doing things into novel solutions to persistent problems. . . .

Engineers would call these solutions to design problems. . . . The history of school reform has been largely first-order improvements on the basic structures of schooling established in the late 19th century.

—Larry Cuban

The Managerial Imperative and the Practice of Leadership in Schools, 1988, pp. 229–230

The table below shows some more ways to differentiate between first-order change and second order change.

Differentiating between First- and Second-Order Change

First-Order Change	Second-Order Change
An extension of the past	A break with the past
Consistent with prevailing organizational norms	Inconsistent with prevailing organizational norms
Congruent with personal values	Incongruent with personal values
Easily learned using existing knowledge	Requires new knowledge and skills

School Leadership That Works, McREL, 2005. Source: Project RED (www.projectred.org)

Magnitude of Change

Magnitude of change refers not to the size of the change but rather the implications of the change for those who are expected to implement it or will be affected by it. It is important to note that the magnitude of change lies in the eye of the beholder and that the same change may have different implications for different stakeholders. Our research suggests that leaders need to understand whether changes are first or second order for staff members and differentiate their leadership styles accordingly.

Conclusion

We believe second-order change is possible: Student performance levels will double, and at the same time costs will go down. Project RED’s findings and recommendations can serve as your guide! Read on for a discussion of our major findings.