

# DISRUPTING CLASS

How Disruptive Innovation Will  
Change the Way the World Learns

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# Contents

Acknowledgments	v
Introduction	1
Randall Circle High School	19
CHAPTER 1: <b>Why Schools Struggle to Teach Differently When Each Student Learns Differently</b>	21
CHAPTER 2: <b>Making the Shift: Schools Meet Society's Jobs</b>	43
CHAPTER 3: <b>Crammed Classroom Computers</b>	71
CHAPTER 4: <b>Disruptively Deploying Computers</b>	89

CHAPTER 5: <b>The System for Student-Centric Learning</b>	121
CHAPTER 6: <b>The Impact of the Earliest Years on Students' Success</b>	147
CHAPTER 7: <b>Why So Many Students Seem Unmotivated</b>	159
CHAPTER 8: <b>Improving Education Research</b>	183
CHAPTER 9: <b>Organizing to Innovate</b>	205
Conclusion	241
Index	249

# Introduction

We have high hopes for our schools. Although each of us might articulate these hopes differently, four seem common to many of us. We summarize these aspirations as:

1. Maximize human potential.
2. Facilitate a vibrant, participative democracy in which we have an informed electorate that is capable of not being “spun” by self-interested leaders.
3. Hone the skills, capabilities, and attitudes that will help our economy remain prosperous and economically competitive.
4. Nurture the understanding that people can see things differently—and that those differences merit respect rather than persecution.<sup>1</sup>

We’re not doing very well in the journey toward these aspirations. Weakening churches and families must shoulder their share of the blame for our backsliding and wheel-

spinning. But most of us wish schools were playing a much more effective role in our efforts to move society toward goals like these.

Why do schools struggle to improve? Everyone has a theory. One is that *schools are underfunded*. If this is the problem, the answer must be more state appropriations, higher local property taxes, and additional fees from parents. Civil rights groups file lawsuits claiming that states that deny schools adequate funding are ignoring their constitutional obligations. And a 2006 Gallup poll suggests that the public favors higher compensation for teachers.

But is money the cause or the cure? The U.S. public education system spends more per student than all but a few other countries, and yet, on average, its students often perform at or below the level of those in other economically advanced countries. Over the past three decades, real spending per student has doubled without a commensurate gain in achievement. And across school districts, spending per student does not necessarily track performance. Just compare two schools in Kentucky: In 2004, Portland Elementary School in Jefferson County spent three times as much per pupil as did Carlisle County Elementary School. Yet Carlisle County, which has a similar demographic makeup to Portland, scored 26 percent better on the state accountability index.<sup>2</sup> This is not to say that money does not matter. But if money or the lack of it by itself explained why the struggles persist, we would not see the anomalies across nations, within Kentucky, or, indeed, across many other districts in the United States. Other forces must also be in play.

Perhaps there's a problem because there *aren't enough computers in the classroom*.<sup>3</sup> When the push to add computers in classrooms started in the mid-1980s, this now-common tool of work and play was just beginning to penetrate every sector of society. Many people predicted that computers would revolutionize the world, and they viewed not having computers in schools as an injustice.

Similar to spending overall, spending on computers in schools has increased dramatically. By 1995, the average public school in the United States had 72 computers available to support instruction. By 2003, this average had nearly doubled to 136. And whereas in 1998 there was an average of 12 students for every computer with Internet access, by 2003, that number was down to nearly 4. If the addition of computers to classrooms were a cure, there would be evidence of it by now. There is not. Test scores have barely budged. There must be a better explanation than more computers and technology.

Another camp *blames the students and their parents*. Educators often complain about students who are uninterested and not ready to learn or parents who do not monitor homework or show up for conferences. This argument resonates with the public. They see kids on street corners with their hats in a backwards pose and their trousers dragging and droopy. Indeed, just to exacerbate the problem facing schools, the number of students from minority backgrounds, who have historically performed least well in U.S. schools, has skyrocketed in recent years, from just over 20 percent in the 1970s to around 35 percent today. And the population of those who do not speak English at home, a population that has also underperformed historically, has also climbed, from just under 10 percent before 1980 to around 20 percent today.<sup>4</sup>

These factors certainly make a school's job harder. But there are anomalies to this generalized explanation that suggest that this is not the root cause of schools' struggles either. Many schools where these "least promising" children dominate the enrollment have comparable results to schools with more affluent populations. Take the example of Montgomery County Public Schools in Maryland, which has divided its schools into two categories: red-zone schools, which are those highly affected by poverty, and green-zone schools, which are not. Ever since the district identified the red-zone schools and began treating them differently from their green-zone counterparts, performance by minority students in the red-zone

schools has soared to the point where it now approaches that of the predominately white students in green-zone schools.<sup>5</sup> Furthermore, the entering quality of students tells us nothing about how the schools themselves are operating once the students are in the classroom. There has to be a better explanation than simply blaming the students.

Could it be that the *U.S. teaching model is simply broken compared to other models in other countries*? Picture a school in which in every classroom, the teacher stands at the front of the room and lectures all day at the students. The students never speak, and even if they do not understand a concept, they never ask for help. The teacher just keeps lecturing. Exams test rote memorization. Now contrast this with a class in which the teaching methods are more varied and the environment more energetic. Yes, the teacher lectures, but students frequently raise their hands to participate in discussions. Other times students do work while the teacher walks around and offers a helping hand. And at still other times, students work on fun projects in groups.

Which school is better? Most say the latter one is. What is interesting, however, is that the former school is representative of the traditional classroom model in much of Asia, while the latter more typifies the U.S. style.<sup>6</sup> Based on this, we would expect the students from Asian classrooms to perform more poorly than those in the United States. But, on average, the Asian students actually score far higher on math assessments than the U.S. students do. Paradoxically, many of these Asian schools have been adopting many of the U.S. schools' practices. So there must be a better explanation than a broken teaching model.

Then the *teachers unions must be the problem*. Many make the argument that unions force school districts to put a higher priority on the needs of the professionals working in the system than on the students' needs. If we could free the schools from the unions' stranglehold, the logic goes, the schools would better serve their students.

Like all explanations, this may be true to a degree, but as the definitive explanation, it does not hold up. The Montgomery County Public Schools district, for example, has a strong teachers union, whereas the Charleston County, South Carolina, district has no teachers union. And yet, students in Montgomery County Public Schools outperform those from Charleston.<sup>7</sup> Indeed, some chartered schools in the United States, which are free from the constraints of teachers unions, perform no better—and sometimes perform even worse—than the unionized schools.\* So solving the union problem may not solve the schools' problem.

So if too little money, too few computers, uninterested or unprepared students (and parents), a broken teaching paradigm, and strong unions individually are not the root cause of the U.S. public schools' struggles, might it be that *they all are conspiring collectively to constrain* the United States? Of course. But all these issues are at work in other nations' schools as well—and yet the evidence is that many of them obtain better results than we do in the United States.

As the evidence discredits the common explanations for the educational struggles one by one, another accounting has more recently emerged: *The way we measure schools' performance is fundamentally flawed*. This, of course, is also true. Even the best measures are an approximation of the underlying reality—for every country's schools.<sup>8</sup>

But consider this observation, which goes beyond the hotly contested validity of test scores. One of the authors of this book,

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\* In this book we use the term *chartered schools* rather than the commonly used *charter schools*. We are referring to the same phenomenon, but we use the different language in reaction to the fallacy of the common expression, which expresses as a compound noun what is an adjective and a noun. Calling a school a *charter school* implies a typology that does not exist. The notion of charter refers only to the manner in which a new school was created. Indeed, schools that were created through charters today reflect a rather full range of typologies—some are quite traditional in their practices, whereas others are organized around student projects or are virtual schools with no physical structure. So although it will strike some as odd, we prefer the word “chartered” because it is a more accurate characterization of the shift in public policy that began in the early 1990s.

Clayton Christensen, has frequented Silicon Valley's corridors and cubicles for much of his professional life. Thirty years ago, people born and educated in the United States largely occupied those workspaces. Today, a stunning proportion of the people in these offices and cubicles are Israeli, Indian, and Chinese. Those educated in U.S. schools are losing share—and it's not because the United States is uniquely unable to measure true academic achievement. The United States has kept its technological edge in the world not because its public schools are sending the best potential technologists to U.S. colleges. The United States is clinging to its advantage because it has continued to be a magnet for the best talent in the world. But this, too, has begun to change.<sup>9</sup>

If the common explanations do not explain the problem, what is the reason for the educational woes?

## ❖ THE CAUSES OF EDUCATIONAL MALAISE

The purpose of this book is to dig beneath the sorts of surface explanations summarized above to expose more fundamental root causes for why schools struggle to improve. Upon that basic foundation, we then construct a set of recommendations to resolve those problems. Our methods for reaching these conclusions are unique. Most books on the topic of improving schools have reached their conclusions by studying schools. In contrast, our field of scholarship is innovation. Our approach in researching and writing this book has been to stand *outside* the public education industry and put our innovation research on almost like a set of lenses to examine the industry's problems from this different perspective. The ability of these lenses to shed new light on complicated problems has been proven in contexts ranging from national defense to semiconductors, from health care to retailing, and from automobiles to financial services to telecommunications. We hope that this novel approach to the problems of public education will prove to yield comparably innovative insights.

So let's diagnose the fundamental problem. If other countries have these same factors at work in their schools as we do in the United States, why is it that so many of their students outperform U.S. students?

Motivation is the catalyzing ingredient for every successful innovation. The same is true for learning. We all know that becoming a great athlete or a great pianist requires an extraordinary amount of consistent work. The hours of time required to train the brain to fire the synapses in the correct ways and thus hone the necessary muscle memory and thinking required is no different from that needed to learn to read and process information or think through math and science problems. Motivating customers to do something is a problem that every organization faces. It is not unique to education.

Motivation can be extrinsic or intrinsic. *Extrinsic motivation* is that which comes from outside the task. For example, a person might learn to do something not because she found the task itself stimulating or interesting, but because learning it would give her access to something else she wants. *Intrinsic motivation* is when the work itself stimulates and compels an individual to stay with the task because the task by itself is inherently fun and enjoyable. In this situation, were there no outside pressures, an intrinsically motivated person might still very well decide to tackle this work.<sup>10</sup>

When there is high extrinsic motivation for someone to learn something, schools' jobs are easier. They do not have to teach material in an intrinsically motivating way because simply offering the material is enough. Students will choose to master it because of the extrinsic pressure. When there is no extrinsic motivation, however, things become trickier. Schools need to create intrinsically engaging methods for learning.

Consider this example. When Japanese companies were developing their world-class manufacturing clout and passing U.S. companies in the 1970s and 1980s, a common explanation was that four times as many Japanese college students

were studying math, science, and engineering than were U.S. students—despite the fact that Japan had only 40 percent of the population of the United States. These scientists and engineers, many concluded, were responsible for Japan’s economic ascendancy, which was widely seen as a threat to the U.S. economy.<sup>11</sup>

As Japan reached prosperity, an interesting thing happened, however. The percentage of students that graduated with science and engineering degrees declined. Why did this happen? The answer has little to do with the schools themselves, which did not change significantly. Prosperity was the culprit. When Japan was emerging from the ashes of World War II, there was a clear extrinsic motivation that encouraged students to study subjects like science and engineering that would help lift them out of poverty and reward them with a generous wage. As the country and its families prospered, however, the external pressure diminished. Some people who are wired to enjoy science and engineering in the way schools traditionally teach it—and therefore are intrinsically motivated—or those who have other extrinsic motivations in play still study them. But many no longer need to endure studying subjects that are not fun for them. The same downward trend is now beginning in Singapore and Korea. As their economies have prospered, a smaller portion of their students are studying math and engineering because the extrinsic motivation has disappeared—and there is precious little intrinsic motivation, given the way these subjects are taught.

Let’s take one more example. As we said earlier, one of the authors of this book, Clayton Christensen, knows many of the “founders” of Silicon Valley well. These men and women are world-class engineers, mathematicians, and scientists. Few of the children of these titans, however, have studied these subjects. Instead, they’ve chosen fields in the humanities and social sciences. With prosperity in the family, one extrinsic motivation to study these subjects is gone. As the U.S. president John Adams famously wrote:

*I must study politics and war that my sons may have liberty to study mathematics and philosophy. My sons ought to study mathematics and philosophy, geography, natural history, naval architecture, navigation, commerce, and agriculture in order to give their children a right to study painting, poetry, music, architecture, statuary, tapestry, and porcelain.*

Adams was on to something. As a developing country develops an industrial-based economy, studying science, math, and engineering offers big rewards that ensure students an escape from poverty. When the same country achieves stability and prosperity, students have more freedom to study subjects that they find fun and intrinsically motivating.

Oddly, therefore, prosperity can be an enemy to the motivation needed to study topics that are not taught in intrinsically motivating ways.<sup>12</sup> This is a key reason why technological advantage shifted first to Japan and is now shifting to China and India. Because of a variety of cultural, economic, and societal factors, the United States' schools start from a disadvantage compared to many of their international counterparts, where there is far more extrinsic motivation present in society. We also note that in many developing countries, studying hard and mastering science and engineering in school does not necessarily result in prosperity—at least not yet. In those countries, there isn't much of an extrinsic reason to endure school either.<sup>13</sup>

Prosperity isn't the only factor, of course. As we explain in Chapter 7, the primary job or fundamental driver among every student is to feel successful, and all students are motivated to do that. Schools as currently constructed do not nail this job, however, for many students, including many lower-income students in prosperous societies, in part because there are complicated cultural and familial influences at work as well. The famous Coleman report (1966) made this argument. It showed that family background was the factor of greatest

importance in determining how a student performed in school in the United States. A conclusion is that schools cannot be expected to carry society toward the objectives we list at the outset of the chapter. Nonetheless, schools must be a significant, positive force in this direction, and if they are tailored to nail students' jobs, they can certainly improve.<sup>14</sup>

Schooling can and should be an intrinsically motivating experience. The questions are why this often has not been the case, and how to resolve these problems. Explaining why and how is the purpose of this book.

## ❖ SOURCES OF SCHOOLS' STRUGGLES

The following chapters summarize what we have seen by standing outside the public education industry and examining it through the lenses of the theories of disruptive innovation. These theories have emerged from two decades of research. These are theories whose applicability is not limited to specific industries or to for-profit enterprises only. As you'll see in the following chapters, they shed considerable light on the challenge of making learning intrinsically motivating for each student. From this diagnosis of the root causes, a promising path emerges that offers a way forward for educators from around the world to ensure that each individual student learns.

Although the examples in this book are largely from the United States, we believe that the lessons apply to contexts around the world. In fact, some of our recommendations already are beginning to be implemented in many developing countries.

Many of the theories on innovation have emerged from our own research, but we are also indebted to many other scholars and practitioners for much of what follows. Here is a chapter-by-chapter preview of the book:

*Chapter 1:* Every student learns in a different way. This idea—that students have different learning needs—is one of the cornerstones of this book. A key step toward making school

intrinsically motivating is to customize education to match the way each child best learns. As we explain in this first chapter, schools' interdependent architectures force them to standardize the way they teach and test. Standardization clashes with the need for customization in learning. To introduce customization, schools need to move away from the monolithic instruction of batches of students toward a modular, student-centric approach using software as an important delivery vehicle.

*Chapter 2:* What gives us confidence that schools are able to make the shift to a student-centric approach? A primer on the theory of disruptive innovation reveals that schools in the United States have in fact constantly improved. Society just keeps moving the goalposts on schools by changing the definition of quality and asking schools to take on new jobs. Even in these new landscapes, where most successful organizations fail, schools have adapted remarkably well.

If you aren't familiar with the theory of disruptive innovation, Chapter 2 will prove helpful to your understanding the rest of the book. Disruption is a positive force. It is the process by which an innovation transforms a market whose services or products are complicated and expensive into one where simplicity, convenience, accessibility, and affordability characterize the industry.

*Chapter 3:* Given the present interdependent curricular architecture of most schools, what might allow them to migrate to a more modular, student-centric approach? Technology presents a promising path. We broadly define technology as the processes by which an organization transforms inputs of labor, capital, materials, and information into products and services of greater value. Hence, all firms, including schools, employ a range of technologies. Some of these are *student-centric technologies* that can mediate the clash caused by the need to standardize the way schools teach and test versus the need to customize how students learn. In its most common manifestation, student-centric technology comprises a computer

with software, which can tailor itself to a student's specific type of intelligence or learning style. An individual tutor would be another type of student-centric technology. *Monolithic technology*, in contrast, employs a single instructional style for all students. A teacher lecturing a classroom of students, all of whom use the same textbook, is the most common monolithic technology in education. But computers whose software tries to teach all students in the same way would also be a monolithic technology.

The question is: why haven't schools been able to march down this path? After all, they have spent upwards of \$60 billion over the last two decades placing computers in schools. The answer is that schools have done what all organizations are inclined to do when instituting a new technology. They have "crammed" the new technologies into their existing structure, rather than allowing the disruptive technology to take root in a new model and allow that to grow and change how they operate.

*Chapter 4:* How then can schools successfully implement computer-based learning? The key is to let it compete against nonconsumption at the outset, where the alternative to taking a class from the computer is nothing at all. We explain what this means in this chapter, as well as offer examples of how schools are already doing this and how they might do it even more successfully.

*Chapter 5:* Disruption is a two-stage process. We show in Chapter 4 that schools are already implementing computer-based learning. But to move to full student-centric learning, we will need to incubate many of these technologies outside the K–12 public education system. Disruption and student-centric technology must first solve important problems outside the traditional classroom before they transform learning in schools. In so doing, they will, over time, likely fashion an entirely new commercial system in education. We give some educated guesses in this chapter at what this might look like.

*Chapter 6:* The first five chapters form an interdependent argument about how to migrate from monolithic methods

of instruction to student-centric technologies in the K–12 years—something we believe is crucial to enable children to realize their highest potential. There is an overwhelming body of evidence, however, that starting at age 5 in kindergarten is much too late. Indeed, our experiences in the first 18 months of life largely shape our intellectual capacities. And much of the self-confidence that buoys us up or bogs us down through the rest of our lives is essentially in place by age 5. Addressing these issues is itself a book-length project, but as the movement to expand to universal pre-K grows, it’s something important to address. In Chapter 6, we take a 10,000-foot view of these challenges and evaluate the possible efficacy of certain solutions that have been proposed.

*Chapter 7:* The challenge of student motivation is a pervasive and increasingly problematic barrier to improving students’ learning. As we mentioned earlier, motivating one’s customers is a problem every organization faces. In this chapter, we reframe this problem by asking what jobs are students trying to do in their lives—and the insights may surprise you. Answering this question shows us that students are actually highly motivated—but also that schools are competing for students’ time against many other opportunities that aren’t related to education and, in many cases, are falling short.

*Chapter 8:* Here we explain why the standard research approach in collegiate schools of education has not provided clear guidance to educators. This chapter suggests a way forward for education research in the field to improve predictability in education.

*Chapter 9:* Why do solutions that transform one organization prove impossible to implement in another? Rarely is the root cause that employees in one institution are eager to improve and solve problems, whereas those in the other passively embrace mediocrity. Most often it relates to the willingness or ability of the managers in the different organizations to create organizational structures that enable new solutions to be formulated and implemented successfully. In this chapter, we apply theories from our research to offer a managerial

tool kit to school leaders and policymakers as an aid in implementing these changes and specifically talk about the need for autonomy, separation, and the use of power tools in setting up new schools—like chartered and pilot schools—and structures to solve pressing problems in education.

The road to realizing our highest hopes for our schools is not an easy one. But with breakthroughs occurring every day in understanding how children learn and how they build intellectual capacity, there is a great opportunity to make strides in the years ahead, provided we do so with an understanding of the root causes of why schools have struggled so much. If we embark upon the promising path we outline in this book, we can make schooling intrinsically motivating and help our children maximize their individual potential to realize their most daring dreams.

To start us down this path, we begin with a fictional story set in a struggling high school in California. This opening vignette introduces us to the central characters in a story that runs through the book at the beginning of each chapter.

## NOTES

1. We thank our friend Dennis Hunter for helping us articulate these widely shared goals. Over the past few years of researching this book, many people have expressed to us high hopes for our schools. Our list here is certainly not collectively exhaustive or a scientific approach to capturing these aspirations, but it represents an attempt by us to capture the spirit and intent for what many of us hope our schools will help those in the next generation attain.
2. Like Portland, over 50 percent of Carlisle's students are on free/reduced lunch.
3. Although most educators have moved beyond making this argument after seeing its limitations, many politicians and pundits still put forth this point, and many polls capture the feeling from the public that investment in computers is vital for a school. Indeed, as we suggest in this book, computers can play an important part in helping our schools improve, but it matters far more how they are used and implemented than just the mere addition of them.
4. "Elementary/Secondary Education: Table 5-1," *Participation in Education*, National Center for Education Statistics, <http://nces.ed.gov/programs/>

- coe/2007/section1/table.asp?tableID=667. “Elementary/Secondary Education: Table 6-1,” *Participation in Education*, National Center for Education Statistics, <http://nces.ed.gov/programs/coe/2007/section1/table.asp?tableID=668>.
5. For example, the percentage of African American and Hispanic kindergartners in the red zone reading at or above the end-of-year reading benchmark now nearly matches that of white students in the green zone, up from a significant gap just five years ago. Montgomery County Public Schools presentation, Harvard Public Education Leadership Conference, June 20, 2007.
  6. Michael Alison Chandler, “Asian Educators Looking to Loudoun for an Edge,” *The Washington Post*, March 19, 2001, p. B01. Also from Clayton M. Christensen’s firsthand observations.
  7. We understand that private school enrollment ratios factor in here. They are quite high in Charleston among white students, although this plays into the “bad-student argument.” Still, the anomalies show that the existence of teachers unions cannot be argued as the crucial pivot point for the success of schools.
  8. To some extent all countries face the same problems the United States does. First, no country has agreed upon the magic all-encompassing “purpose of education”; while the United States frets over low test scores, the Japanese wonder if their rote learning teaching style stifles creativity. Maybe U.S. students’ willingness to question authority and ask “why” is a positive that tests just do not capture. Second, no nation has been able to satisfactorily educate each and every one of its citizens.
  9. An article in *The Economist* adds weight to this observation. “America’s high-tech industries are powered by foreign brains,” it notes. “Almost a third of Silicon Valley start-ups since 1995 were founded by Indians or Chinese. They also power great U.S. universities, particularly the science departments. About 40 percent of people earning Ph.D.s in computer science and engineering are foreign-born.” But as we note, America’s attraction to foreign-born talent is waning. *The Economist*’s article talks about how U.S. immigration laws create long waiting times for talented workers to enter the country and, consequently, turn them off. Furthermore, other countries—“including Australia, Canada, Britain, Germany, and even France”—are clamoring for this talent. “At the same time the Indian and Chinese economies are booming. . . . Indians and Chinese were once willing to put up with any humiliation for a chance of a career in the United States. Now they have more and more choices back home.” “American Idiocracy: Why the Immigration System Needs Urgent Fixing,” *The Economist*, March 24–30, 2007, p. 40.
  10. To capture what social scientists call the “discretionary effort” of students, people are giving more attention to the sources of motivation. Mihaly Csikszentmihalyi, a psychology professor at Claremont Graduate University and

a leading proponent of positive psychology, is best known for writing about the “flow.” In an interview with *Wired* magazine for its September 2006 issue, Csikszentmihalyi described “flow” as “being completely involved in an activity for its own sake. The ego falls away. Time flies. Every action, movement, and thought follows inevitably from the previous one, like playing jazz. Your whole being is involved, and you’re using your skills to the utmost.” This concept is another way of thinking about intrinsic motivation. See “Go With the Flow,” *Wired*, September 2006, issue 4.09.

11. C. M. Christensen, T. Craig, and S. Hart, “The Great Disruption,” *Foreign Affairs*, vol. 80, March/April 2001, pp. 80–95.
12. In a report, parents and students note that they don’t see the relevance of these higher-level topics and skills for their own lives. Public Agenda, which produced the report, noted that this mirrored national results. Interestingly, parents and students were more motivated to push for these subjects if it would benefit them in the college application process. See Alison Kadlec and Will Friedman with Amber Ott, *Important, but Not for Me: Parents and Students in Kansas and Missouri Talk about Math, Science, and Technology Education*, Public Agenda, 2007. Summarized in Meris Stansbury, “Parents, Kids Don’t See Need for Math, Science Skills,” *eSchool News*, September 21, 2007.

There are more cards stacked against producing more U.S. scientists, according to several reports. A *Chronicle of Higher Education* article cites evidence that the “long periods of training, a shortage of academic jobs, and intense competition for research grants” cause many of America’s brightest students to bypass careers in science. More and more Ph.D.s enter into temporary postdoctoral positions, as opposed to full-time jobs, and therefore their job security and economic futures are uncertain. Many undergraduates see the problem early and opt out of the sciences while they’re still in college. Others jump ship for other opportunities in commercial fields. Richard Monastersky, “The Real Science Crisis: Bleak Prospects for Young Researchers,” *The Chronicle of Higher Education*, September 21, 2007.

As another article says, “Many qualified Americans shun science because, far more than the drum beaters let on, science can be a risky, unrewarding career choice. When it comes to agricultural picking and stooping, our foreign reliance is easily understood even without a rudimentary grasp of economics: The pay and working conditions are so miserable that only impoverished foreigners see the chance of a step up. . . . The reliance on foreigners to fill U.S. science classrooms and staff labs and science and engineering faculties is similarly clear.” He goes on to detail the career choice for someone thinking about law school with its \$100,000 salary in three years or a Ph.D. with its pay of \$40,000—maybe—in five to seven years. “For the many young foreign students from developing countries who seek

- promising careers, science in America is extremely attractive compared to the choices back home.” Dan Greenberg, “No Mystery Why Americans Shun Science Careers,” *The Chronicle of Higher Education*, December 17, 2007.
13. In a study in Usenge, Kenya, researchers tested children’s ability to adapt to their indigenous environment. What they found was that students had great knowledge of how to survive in their climate—how to recognize and overcome parasitic illnesses, for example. Children’s scores on tests to measure this were inversely correlated with tests that measured more academic knowledge, such as that taught in schools. They did well in the former and poorly in the latter. In Robert Sternberg’s words, “From the standpoint of an academic test, the rural Kenyan children would not look very bright. But in fact, they have learned knowledge that was important in their own cultural context. . . . To these children in rural Kenya, however, the intelligence needed for survival and success in life, in general, may not be the same as the intelligence needed for success in school, and the former may be more important to them than the latter.” In other words, the children would learn what they had an outside motivation and need to learn because it was more relevant to their immediate lives. Robert J. Sternberg, “Who Are the Bright Children? The Cultural Context of Being and Acting Intelligent,” *Educational Researcher*, vol. 36, no. 3, 2007, pp. 149–150.
  14. There is a long-running debate on this. For one side of it, see Richard Rothstein’s *Class and Schools*, which makes the argument that schools can’t fix these problems alone. The country needs policy changes in health care, improvements in early childhood care/education, and so on. A book by Abigail and Stephan Thernstrom titled, *No Excuses: Closing the Racial Gap in Learning*, takes the other side. It hypothesizes that there are some schools, like the Knowledge Is Power Program (KIPP) and others, that do not have any excuses—in other words, they don’t blame health care or poor parenting—and they do what Rothstein says is impossible and turn really poor students into high achievers. Rothstein addresses this concept specifically in his book with a multifaceted response. First, he says that a few anomalies do not prove anything. He presents research on the KIPP children, who are supposedly the worst-performing and poorest children in the surrounding public schools. He polls teachers from surrounding schools, however, and finds that they are, in fact, sending the children with the highest potential. This and the fact that KIPP forces parents to be involved—just the very fact that they have to apply and sign a contract indicates that they are more invested than the average parent—means that to Rothstein, this is not a fair sample. He also cites that KIPP is a middle school, and there is no evidence that its students attend college or succeed in the long run at greater rates. He also cites AVID (Advancement Via Individual Determination) and

says that you cannot use it as an example that the Thernstrom argument is possible because children are interviewed and those with the highest potential, despite poor grades, are taken in. See Richard Rothstein, *Class and Schools: Using Social, Economic, and Educational Reform to Close the Black-White Achievement Gap* (New York: Teachers College, Columbia University, 2004). Abigail Thernstrom and Stephan Thernstrom, *No Excuses: Closing the Racial Gap in Learning* (New York: Simon & Schuster, 2003).