Opportunity by Design

New High School Models for Student Success

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New High School Models for Student Success

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"In the 21st century, we know a great deal about education and how it intersects with the needs of our society and our democracy. In that connection, today, one thing is certain: while it is important to graduate from high school, high school is not an end in itself, but rather preparation for college as well as life-long learning. It is one part of the path that leads students towards their ultimate potential in any field of endeavor as well as in finding personal satisfaction in their lives. To reach these goals, students deserve the best possible education that we can provide. As 'the richest nation on earth,' it is morally indefensible to give them anything less. At Carnegie Corporation, which has been working to advance education for one hundred years, we are committed to the idea that no student can be written off as mediocre or inconsequential. All students deserve to aspire to excellence. It is our responsibility to ensure that eventually, all schools in the United States can offer that opportunity to all students."

Vartan Gregorian
President, Carnegie Corporation of New York

The Common Core State Standards and Next Generation Science Standards represent major, critically important commitments by states to educate all young people for success in a global economy and full participation in an increasingly complex world. As schools, school districts, and states prepare for implementation, many are asking what it will take to deliver on the opportunities offered by the new standards.

States have designed the new standards to be "fewer, clearer, and higher" than existing standards systems. They have been explicitly developed to enable a more integrative approach to student learning, one that places greater emphasis on cultivating the combination of knowledge and skills students need to solve complex problems, develop and weigh evidence, and continue to learn throughout their lifetimes. Another major innovation is the introduction of high-quality, shared assessments, closely aligned to the standards.

The new standards have the potential to become powerful tools for aligning our educational system for performance. For teachers, the new standards will provide a shared framework of expectations for preparing all students for college and careers. For school systems, the standards offer a unique opportunity to "reset" instruction and the elements that support it—from curricular materials and student assessments to teacher preparation and professional development—on a strong, common foundation, thus enabling significant economies of scale and a powerful platform for continuous learning and improvement.

Common Core and Next Generation Science Standards: A Shared Foundation

- **45 states and the District of Columbia** are implementing the Common Core State Standards in English and math (corestandards.org)
- **26 states** are involved in developing the Next Generation Science Standards (nextgenscience.org)
- **Two multistate consortia** are developing aligned, high-quality assessments (parcconline.org and smarterbalanced.org)

To make the most of what the new standards offer, states and districts will need to use them strategically to power meaningful change. As the mixed record of standards implemented during the No Child Left Behind era shows, standards cannot drive real, widespread improvement unless they are coupled with a push to redesign how schools actually work for students and teachers.

Nowhere is the need for redesign greater or more urgent than in American high schools. In the context of the Common Core, high schools will be charged with educating all students to achieve much higher levels of skill and knowledge, a monumental challenge. At the same time, high schools will continue to be responsible

for meeting the learning needs of large numbers of students who enter ninth grade performing significantly below grade level. To meet that dual demand, schools will need to do two things simultaneously: accelerate all students' learning to reach higher levels and use recuperative strategies to help underprepared students catch up. Both types of opportunities for students will be essential to prepare all to succeed in postsecondary education, which is increasingly a requirement for all but the lowest-paying jobs.

Acceleration and recuperation are not radical concepts, but making them fully available to every student will require a radical rethinking of business-as-usual school models and a decisive move away from the one-size-fits-all high schools that persist today. States and districts must act now to design schools that use their most valuable resources—teaching, technology, time, and money—in new ways, so that educators have the resources to motivate, engage, and guide all young people toward graduation and further education or training.

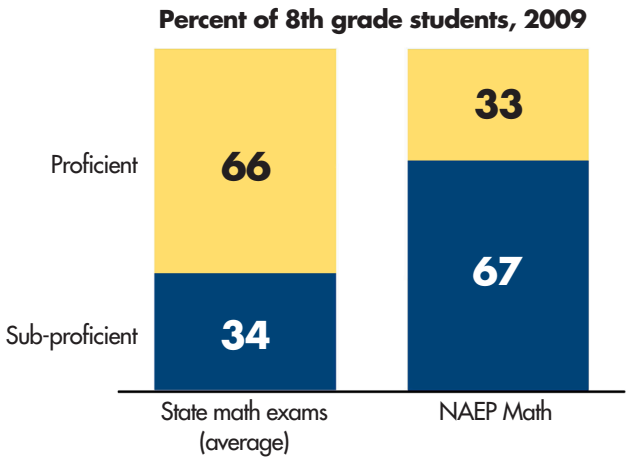
School redesign is an ambitious response to the challenge of the Common Core, but nothing less will capitalize fully on this extraordinary opportunity and produce the realignment of resources needed to provide all high school students, including those who are underprepared, with powerful, personalized learning. Single efforts—even important ones like improving the quality of teaching—will be insufficient to the needs of the millions of young people whose future depends on getting a strong secondary education over the coming decade.

Confronting the Challenge of the Common Core

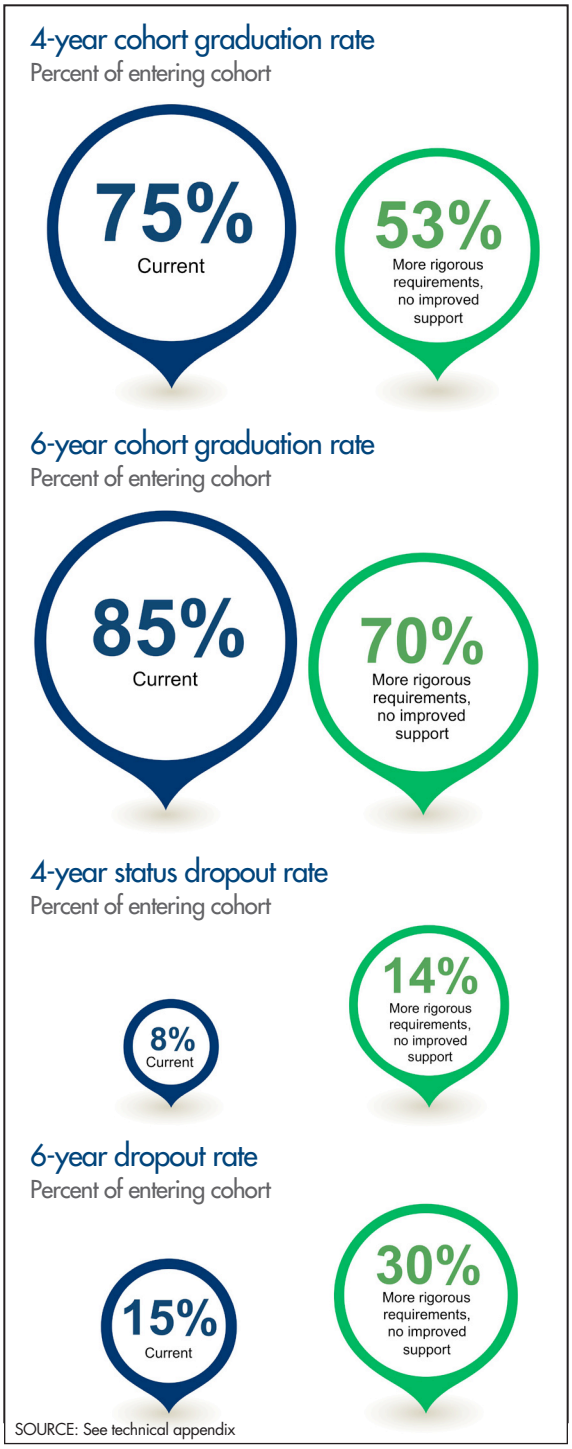
American high schools must do a better job of preparing students to tackle college-level work. Across the United States, aggregate college data show that students often leave high school without the skills and knowledge they need to succeed in postsecondary education. Approximately 40 percent of U.S. high school graduates must take remedial courses in English or math before they qualify for credit-bearing college work, thus making it even harder and more costly to earn a degree.[1] For young people, the long-term impact of struggling in college and leaving without earning a degree can be profound, since current estimates show that at least some postsecondary education will be required for approximately two-thirds of all jobs by 2018.[2]

American high schools, particularly those in high-need urban districts, serve a population of students with widely divergent levels of preparation and a variety of learning needs. Today, more than a third of students (34%) enter high school having scored below grade level on their eighth grade state exams, posing a daunting challenge for teachers charged with getting students on track toward college and career readiness.[3] Under the Common Core, the challenge of educating underprepared high school students is about to grow even sharper: results from the 2011 National Assessment of Educa-

Current proficiency levels of entering high school students, as measured by 8th grade state and NAEP math exams



SOURCE: U.S. Education Department 2009 NCLB reported results; NCES reporting of 2009 NAEP results

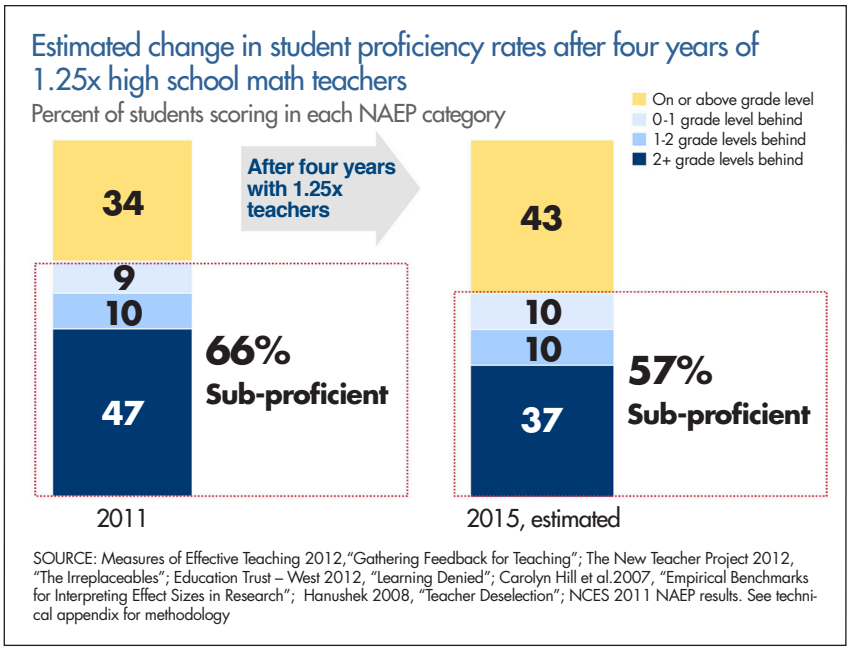


tional Progress (NAEP) math exam, which resembles the forthcoming Common Core–aligned assessments in important ways, show that two-thirds (67%) of eighth graders perform below grade level. In other words, our high schools face a daunting preparation shortfall among entering students.

More effective education in the early grades should begin to address the problem over the next few years, as the Common Core and Next Generation Science Standards are implemented in elementary and middle schools around the country. In the meantime, high school teachers face a difficult dilemma: they must strive to hold all students to significantly higher standards for graduation, while at the same time supporting and motivating even the most underprepared students. If the research on the effects of course failure on student persistence to graduation holds true,[4] we can expect to see a near-term growth in dropout rates for schools that do not both recuperate and accelerate student learning.

Many states have recognized this as a looming crisis. An October 2011 publication by the National Governors Association calls attention to "the stark reality that large numbers of students will not be deemed college and career ready in the first few years after the transition [to the Common Core]. On the basis of current student performance on assessments that estimate college and career readiness, states can expect fewer than half of their students—and in some states fewer than one-quarter of their students—to score at the college- and career-ready level on the 11th grade assessment."[5] The report recommends that governors communicate with the public immediately about the problem. It also urges states to "plan to provide additional supports…for students who do not meet the college- and career-ready threshold." These recommendations are only a first step toward addressing the hurdles that teachers, parents, and, most of all, students will face.

Around the country, states and districts are building systems that will support full Common Core implementation by analyzing their capacity in key areas and taking steps to fill the gaps. They are upgrading curriculum, providing professional development to teachers and school leaders, offering guidance in implementing student supports, and investing in technological capacity.[6] Many are working hard to ensure consistency among



system components—between high school graduation standards and postsecondary placement policies, for example—that have never before been fully aligned. This is essential work and will add immeasurably to the capacity of our educational system. There is a danger, however, that this understandable emphasis on state-level systems will mean a missed opportunity to improve the design of schools themselves.

Innovative School Design: What's Needed and Possible

The implementation of the Common Core is an unprecedented chance to "do school differently" for greater impact. While progress at the state level has been significant, we must also seize this opportunity to redesign schools to enable personalized learning. This means fundamentally reshaping the use of human capacity, technology, time, and money, to provide both recuperative and accelerative opportunities for all students. This will open pathways for more young people to graduate.

So far, much work has gone into retooling many of these elements individually. Many states, districts, and schools have made essential progress in changing teacher preparation and professional development to help talented educators enter and stay in the classroom. There have also been pushes for interventions like additional learning time, new curricula, and new technology, much of which has been shown to have a significant impact on student achievement. However, applied individually, each of these fails to get our schools and school systems where they need to be to serve every student. By purposefully integrating many of these advances in a comprehensive school design, much more can be accomplished than applying each individually.

For example, strengthening teaching receives much necessary attention, and significant leaps have been made in supporting educators. Now is the time to assess whether addressing teaching talent alone is enough to close the student proficiency gaps exposed by the Common Core within approximately the next five years. In a recent modeling exercise, analysts from McKinsey & Company used available estimates of what can be accomplished by top-quartile teachers (those able to "move" student performance at the rate of 1.25 grade levels per year, as triangulated from research by the Measures of Effective Teaching team, The New Teacher Project, Education Trust – West, and Eric Hanushek) to test whether or not it might be possible to avoid large drops in graduation rates using human capital strategies alone. The short answer is no: even coordinated, rapid, and highly effective efforts to improve high school teaching would leave millions of students achieving below the level needed for graduation and college success

as defined by the Common Core. Initiatives designed to strengthen teaching, whether through improved curriculum, excellent professional development, or hiring well-prepared teacher candidates, will be tremendously important to standards implementation, but they cannot possibly meet the demand to raise student achievement to Common Core levels unless they are part of more far-reaching changes in school design.

What can current research tell us about the kind of interventions we might need to make in how schools themselves function to help more students graduate prepared for college and career? Some interventions, like an improved curriculum and additional learning time, do increase student achievement, but likely not enough to help all students meet the demands of the new standards. A recent study by Robert Balfanz and colleagues on the implementation of "Algebra for All" policies in 13 large urban districts offers further insights.[7] Balfanz's research is particularly relevant because districts that require Algebra I for all ninth graders are effectively raising standards for all students in mathematics, a key curricular area; moreover, districts with large numbers of underprepared students often see high course failure rates when the policy is implemented. In a cluster randomized study, the researchers compared the impact of two different ninth grade Algebra I curricula: half the participating schools in each district provided a first-semester course on building the intermediate math skills students needed, followed by Algebra I in the second semester; the other half offered a regular Algebra I curriculum throughout the year, with no recuperative course. What all schools in both groups had in common was this: they redesigned the school day to provide students with a "double dose" of math (two 45-minute periods of math per day) throughout the year. Encouragingly, at the end of both these year-long courses, students' algebra failure rates in participating schools were roughly half those reported in comparable districts that require all students to take algebra by the end of ninth grade but do not double students' math learning time or implement an intermediate skills course. Algebra achievement levels in both sets of study schools were about the same, with students receiving the skills course also showing an increase in general mathematical knowledge.

Yet the authors warn against taking too much encouragement from their findings. "Even with this doubling of instructional time for mathematics for all sample students, and specialized curriculum for some," they point out, "nearly a quarter (23%) of the nearly 5,000 students in the study failed their algebra course at the end of ninth grade," and another quarter "failed to master the material as indicated by a final grade of D." "Current instructional interventions" like those used in the study schools, they conclude, are simply "not yet powerful enough to create more positive trajectories" for many underprepared students.

For Balfanz and his coauthors, these findings demonstrate that comprehensive approaches are needed, including new school designs: "Young people growing up in families where the adults may or may not be just scraping by need comprehensive supports that extend well beyond the classroom. Putting this altogether will in the end likely involve both new school design and a willingness to amass and concentrate federal and state funding streams toward comprehensive evidence based strategies that provide the intensity of supports needed to enable students who enter high school lacking a good middle grades education and a prior history of course failure to succeed."

When the best practices around what we know works in schools are combined to create intentional new school designs that leverage talent, time, money, and technology to meet the needs of each individual, it produces powerful results. Do we have evidence that school design can work at scale to improve outcomes for students, even at a time when standards are rising? In fact, we do.

Between 2002 and 2008, the New York City Department of Education, working with New Visions for Public Schools and other partners, closed more than 20 large, low-performing high schools with graduation

rates between 26 percent and 42 percent and replaced them with more than 200 new secondary "small schools of choice" (SSCs).[8] Serving approximately 400 students each, the SSCs are nonselective, or open to students at all levels of academic achievement, and located in high-need neighborhoods—in other words, designed to enroll the disadvantaged and underserved student populations that had formerly attended the failing schools.

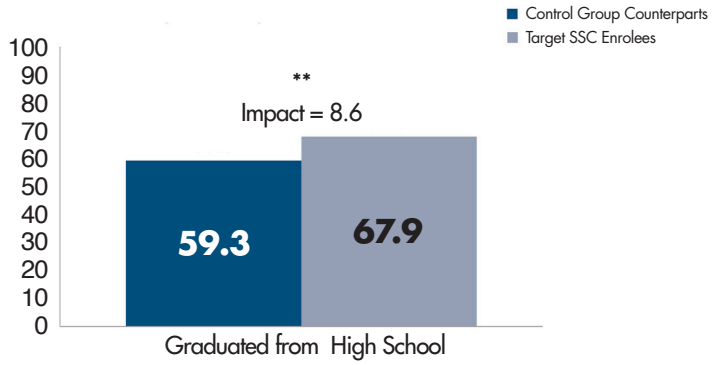
Each small school was established through a competitive proposal process and designed according to research-based, student-centered principles by a planning team that included the school's prospective principal, along with teachers and representatives of community partner organizations. Programmatically, each school integrates a demanding and comprehensive academic curriculum, personal attention to student academic progress, real-world experiences with community partners, and a school-wide commitment to inquiry and continuous improvement.

In a rigorous experimental study that matched SSC students with peers placed by lottery into other New York City high schools, MDRC found that the SSCs increased four-year graduation rates by 8.6 percentage points, from 59.3 percent of students who attended other schools to 67.9 percent for SSC enrollees.[9] Explaining the significance of that effect, the MDRC report authors explain that the increase is "roughly equivalent in size to one-third of New York City's gap in graduation rates between white students and students of color." Further, at full capacity, the SSCs in the MDRC sample study enrolled more than 45,000 students—larger than the high school population of the Houston school district.

Reflecting on the initiative's success, the researchers note that "it is important to recognize that SSCs represent far more than just changes in school size and structure. They also represent innovative ways to use these structural changes to leverage human, financial, and curricular resources."[10] In conclusion, they argue that "the present findings provide highly credible evidence that in a relatively short period of time, with sufficient organization and resources, an existing school district can implement a complex high school reform that markedly improves graduation rates for a large population of low-income, disadvantaged students of color."

A network of 76 early college high schools created across North Carolina since 2005 provides another example of the power of school design at scale. North Carolina New Schools Project (NCNSP) has led this public-private effort, working in partnership with the state's Department of Public Instruction, the North Carolina Community College System, and the University of North Carolina. The early college model provides students with strong, consistent support and increasingly challenging curriculum over four years, enabling them to earn a high school diploma and two years of college credit without tuition.

Estimated Average Effects of SSCs on 4-year graduation rates, student cohorts 1 and 2



SOURCE: Bloom, H. S., & Unterman, R. (2012). *Sustained positive effects on graduation rates produced by New York City's small public high schools of choice.* New York, NY: MDRC.

NOTES: There are 13,064 student observations for cohorts one and two combined. There are no statistically significant differences between estimated effects for the two cohorts.
A two-tailed t-test was applied to the estimated effect. Statistical significance levels are indicated as:
** = 1 percent; * = 5 percent.

Unlike the SSCs in New York, the North Carolina early college high schools admit students on a selective basis, yet each is designed according to NCNSP's five principles for high school innovation and puts a priority on serving students from groups underrepresented in higher education: students of color, English language learners, students from low-income families, and first-generation college goers.[11] The network has shown impressive results, achieving a four-year graduation rate of 93.5 percent in 2012.[12] NCNSP is expanding the model into 18 traditional rural high schools, with support from a U.S. Department of Education Investing in Innovation grant and other funders.

These efforts are meaningful, and a solid foundation from which to respond to the challenges of the Common Core and Next Generation Science Standards. There is additional potential emerging from newer models that also integrate technology to further enhance personalization.

Today's school designers can also look to school models that incorporate blended learning to expand and enhance the capacity of teachers, particularly for integrating recuperative and accelerative strategies within students' individualized learning programs. Across the field, a vision of what blended learning has to offer, and how it can play a key role at the center of school design, is steadily emerging. A 2011 study by Carnegie Corporation of New York, the Stupski Foundation, Opportunity Equation, and the Parthenon Group describes "next generation" learning as "personalized and deeply engaging, focused on deeper learning of higher-order content, complex skills and the integration of the two. It can take place any time and any place, is enabled by new tools—technology, performance-based assessments, and flexible learning environments—and offers students socio-emotional supports in their learning."[13]

The Innosight Institute published a widely accepted definition of blended learning using similar terms: "Blended learning is a formal education program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path, and/or pace and at least in part at a supervised brick-and-mortar location away from home."[14] FSG has recently deepened public understanding of how blended schools are designed in a series of case studies commissioned by the Michael and Susan Dell Foundation, including one featuring the Alliance Technology and Math Science High School, a small school founded in 2011 by the Los Angeles-based Alliance for College-Ready Public Schools charter management organization.[15] Alliance Schools' blended learning strategy evolved from an earlier plan to use technology to create a virtual school for high school dropouts. Instead, Alliance Schools decided to embed blended learning more firmly within school design: it began by piloting a suite of instructional, operational, and financial innovations in two existing schools before making it a foundational component of new school design.

Expansion of quality blended learning requires the development and dissemination of well-articulated learning progressions, aligned diagnostic assessments, and learning resources that can be accessed anytime and anywhere. Encouragingly, the Common Core provides a consistent organizational framework for these tools across states, providing the necessary foundation to increase quality and accelerate progress in their development. What's needed now is a concentrated effort to design innovative schools that build on the foundation of New York City's Small Schools of Choice, North Carolina's early college schools, and other similar efforts, and leverage the new tools and practices in development that support personalized learning.

The key lesson of all this work is that *schools* are the place where the Common Core will or will not make a transformative difference in the learning of American students, particularly those who have struggled to reach high levels of learning under existing systems. To realize the full power of the Common Core, we must look to the design of schools and reshape them to support teachers and maximize key resources, rather than implement

partial solutions that are likely to result in weak performance or even failure.

Enabling Innovative Secondary School Designs

The Common Core and Next Generation Science Standards offer school systems an historic opportunity to reshape themselves to support innovative school designs and replace today's outmoded, industrial-model secondary schools. By treating the implementation of higher standards as a catalyst for designing, iterating on, and scaling effective school models that support teachers in helping students recoup their learning gaps and accelerate their progress, states and districts can build a stronger and broader pipeline between high schools and postsecondary learning, thus delivering on the promise of high expectations for all.

The gains made by New York City's small schools of choice demonstrate that school and system redesign can increase student achievement and graduation, even in schools serving large concentrations of underprepared students. Further, experience in New York, North Carolina, and elsewhere shows that the efforts of individual schools are more powerful when embedded within larger systems of support: otherwise, high-performing schools become isolated proof points in low-performing systems. Moreover, new schools need not follow a single model; rather, distinctive school models can grow and thrive, as long as each is designed through a rigorous process, in accordance with principles based on known best practices.

The process of designing innovative new schools and enabling their implementation and growth will place new demands on districts. To support that work, districts will need to take a hard look at their capacities and, in all likelihood, realign their assets and resources. They will also need to make a candid assessment of existing policies and the extent to which they enable or impede school-level innovation, initiative, and performance.

The principles of effective secondary schools are currently better understood than the role districts should play in enabling them. Recognizing the challenge of the Common Core and Next Generation Science Standards, many districts around the country have been engaged in important reform efforts to transform the way they manage and support human capital, allocate per-pupil and school-level funding, use performance management and accountability systems, and transition into portfolio management organizations. Importantly, much of this system-level work has been accomplished in partnership with expert national organizations. Now is the time to leverage that work and expertise in the service of new secondary school design.

Over the next three years, Carnegie Corporation of New York has committed to catalyze district-based new school design work, using 10 design principles that reflect the research base, capture the input of successful school leaders and educators, and explore the potential of emerging practices. To begin, the Corporation has seeded the launch of a new national school design institute, Springpoint. The institute will partner with the Corporation to source, through a competitive process, a first cohort of three to five districts that demonstrate readiness and capacity to participate in a new secondary school design development and launch process. Selected districts will be funded by the corporation to field new school design teams that will be challenged and supported by Springpoint and its partners to plan and launch new schools.

The Opportunity by Design initiative will lead to the creation of new schools, the development of district capacity to engage in school creation independent of the institute, and the articulation of principles to guide other districts and states in reorienting their assets to develop, support, and sustain innovative new designs that meet the needs of all of their students. Equally exciting, this substantial cohort of rigorously designed new schools will provide crucial opportunities to draw on emerging knowledge about learning science, student resiliency, personalization, and other important areas to build even better and more effective school models.

An effective secondary school design incorporates 10 integrated principles to meet the demands of the Common Core.

These were developed through a scan of design principles used by New York City Department of Education, New Visions for Public Schools, and other high-performing school networks, and refined with the feedback and contributions of experienced educators.

A HIGH-PERFORMING SECONDARY SCHOOL:

Integrates **positive youth development** to optimize student engagement & effort

Caring, consistent student-adult relationships that communicate high expectations for student learning and behavior

Clear expectations for student competencies and standards of performance

Opportunities for students to **contribute** to the school environment and have a **voice** in decisions

Encouragement of **student responsibility** for meeting learning and personal goals

Openness to and encouragement of **family participation**

Integration of **community participation,** assets, and culture

Prioritizes **mastery of rigorous standards** aligned to college & career readiness

Curriculum that **enables all students** to meet rigorous standards

Multiple **opportunities for students** to show mastery through performance-based assessments

Student advancement based on **demonstration of mastery** of knowledge and skills

Continuously improves its operations & model

Use of **performance data and analytics** to improve curriculum and instruction

Regular review and revision of **school operations** and **model** to increase effectiveness

Develops & deploys **collective strengths**

Teacher teaming that strengthens instructional design and delivery and enables professional growth

Mechanisms that promote **innovation and initiative** among teachers and staff

Differentiated roles for adults (e.g., multiple "teacher" roles) that enable effective implementation of the school model

Manages **school operations** efficiently & effectively

Purposeful use of time, people, and technology to optimize teachers' ability to support student learning

All elements of school design organized to maximize **efficient use of resources**

Flexible, customizable scheduling

Clear **operational performance goals** and accountability mechanisms

Automation of basic tasks whenever possible

Maintains an effective **human capital strategy** aligned with school model & priorities

Consistent, high-quality systems for sourcing and selecting teachers and staff

Individualized professional development that cultivates teachers' strengths and meets school needs and priorities, including use of blended learning

Fair and equitable teacher evaluation

Leadership development opportunities and a leadership pipeline

Empowers & supports students through key transitions into & beyond high school

Explicit linkages between **future academic and career pathways** and current learning and activities

Transparency regarding student status and progress toward graduation for students and parents/guardians

Remains **porous & connected**

Effective **partnerships** with organizations that enrich student learning and increase **access to community resources** and supports

Participation in a network of schools that **share knowledge** and assets

Has a clear **mission** & coherent **culture**

Clearly defined **purpose, goals, and school culture**

Mission and culture embodied in all aspects of school design

Personalizes student learning to meet student needs

Instruction in a **variety of learning modalities,** linked to students' strengths and learning goals

Data-driven, real-time feedback for students and teachers

Embedded, performance-based **formative assessments**

Effective use of technology for **anytime, anywhere learning**

Technical Appendix

The following sections articulate the calculations and assumptions behind some of the core analyses conducted by McKinsey & Company analysts and described in the main body of this report.

Calculation of four-year and six-year high school graduation and dropout rates

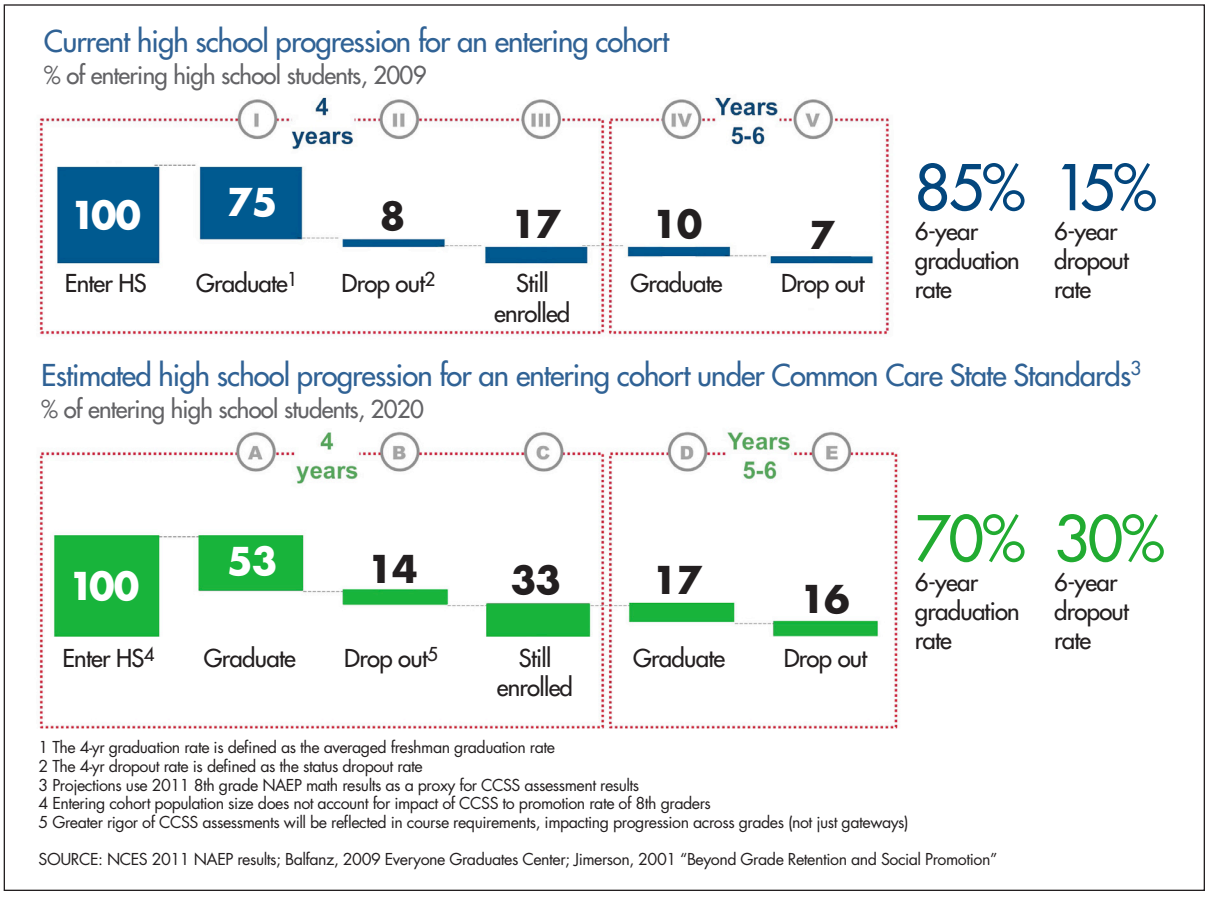
Current rates

- We began with the most recent data available from NCES at the time of analysis, which indicate that 75 percent of the cohort of students who entered high school in 2005 had graduated four years later [I] and that 8 percent of that cohort had dropped out at some point within the same time period [II].

- The remainder of the students in the cohort, or 17 percent, were therefore still enrolled in high school after four years [III].

- Even though the six-year graduation rate is an important indicator of how well our schools are doing, there are no reliable data that shed light on it. Therefore, we needed to make several assumptions to calculate this rate. To do so, we used Jimerson's research on the effects of student retention on dropout rates. Jimerson

Figure 1: Calculation of four-year and six-year high school graduation and dropout rates



shows that the experience of being retained in grade for one year makes students 50 percent more likely to drop out. A 50 percent increase over the 8 percent four-year dropout rate suggests that 12 percent of students who are still-enrolled in high school after four years, or ~2 percent of the entering cohort, drop out in their fifth year. Students who are retained two or more times have a dropout rate of 33 percent, which suggests that ~5 percent of students in the entering cohort drop out in their sixth year (Jimerson 2001, "Beyond Grade Retention and Social Promotion").

- In total, 7 percent of students drop out in their fifth or sixth year of high school [V], leaving 10 percent who graduate in a similar timeframe [IV].

- Combining these assumptions with the four-year rates, we calculated a six-year graduation rate of 85 percent and a six-year dropout rate of 15 percent.

Potential rates in a system with more rigorous requirements and no improved supports

- To calculate the four-year cohort graduation rate under more rigorous requirements (e.g., Common Core State Standards) and with no improved supports, we first estimated the portion of students likely to be performing below grade level under such standards when they enter high school. The 2011 eighth grade NAEP math exam is a useful proxy; it suggests that 67 percent of students would enter high school performing below grade level according to more rigorous requirements than are in place today.

- In today's system, roughly half this number (34 percent) of students enter high school below grade level, and 17 percent of students are still enrolled after four years. By assuming that every student who is still enrolled in high school after four years is also performing below grade level, we concluded that half of students entering high school below grade level will still be enrolled after four years of high school. Given the above assumption, that 67 percent of students will enter high school below grade level under more rigorous requirements and with no additional support, we inferred that ~33 percent of students will still be enrolled in high school after four years [C].

- Next, we assumed that because the number of students who are below grade level will have approximately doubled (67% vs. 34%), the number of students who drop out for academic reasons will double as well. From Balfanz's research, we assumed that 75 percent of students who drop out, or 6 percent of today's entering cohort given the 8 percent four-year dropout rate from NCES, do so for academic reasons (Balfanz 2009, Everyone Graduates Center). Doubling this number, we estimated that 12 percent of the entering cohort will drop out for academic reasons; assuming that the same 2 percent of students drop out for nonacademic reasons, we therefore expect the four-year dropout rate to increase to 14 percent [B].

- Given the above, we expect that the four-year graduation rate could drop to 53 percent (100% – 33% – 14% = 53%) [A].

- We calculated the six-year dropout rate using the same process (and assumptions) as in the current state analysis. In this case, we assumed a 21 percent dropout rate for students in their fifth year and a 33 percent dropout rate for students in their sixth year, for a total of 16 percent of students dropping out in their fifth or sixth years of high school [E].

- Subtracting this 16 percent from the 33 percent of students still enrolled after four years, we calculated that 17 percent of the entering cohort would graduate in their fifth or sixth years [D].

Table 1: Distribution of entering high school students by NAEP math scores, grade level, and number of years of a 1.25x teacher needed

Score range	Years behind	% students (# of students) 2011	Years of 1.25x teacher needed (max = 4)
296 – 299	0 - 0.5	4% (147,000)	2
291 – 295	0.5 – 1	5% (184,500)	4
282 – 290	1 – 2	10% (368,000)	4
273 – 281	2 – 3	10% (368,500)	4
264 – 272	3 – 4	9% (331,500)	4
0 – 263	4+	28% (1,031,000)	4

- Combining these with the four-year rates, we calculated a six-year graduation rate of 70 percent and a six-year dropout rate of 30 percent.

Calculating the gap in 1.25x teachers, and the number of students who would still be sub-proficient even after being taught by a 1.25x teacher for each of their four years of high school

Gap in 1.25x teachers

- To translate eighth grade math NAEP scores to the math grade-level performance of entering high school students, we first calculated how many points are equivalent to one grade level of learning on the NAEP math test. To do this, we multiplied the standard deviation on the NAEP exam (36 points) by .25 standard deviations, which has been identified by researchers as equivalent to one grade level of improvement on nationally norm-referenced exams (Carolyn Hill et al. 2007, "Empirical Benchmarks for Interpreting Effect Sizes in Research"; Hanushek 1998, "Conclusions and Controversies about the Effectiveness of School Resources"). This resulted in one grade level in math equaling nine NAEP points.

- We assumed that a proficient score on NAEP (299 points) is synonymous with being at grade level. We then subtracted the appropriate number of NAEP points to see how many students are on grade level, 0.5 years behind, etc. (see Table 1).

- Assuming that a 1.25x teacher increases student performance by 1.25 grade levels in one school year, we determined how many years a student would need a 1.25x teacher to reach proficiency (e.g., two years if 0–0.5 grade levels behind, four years if 0.5–1 grade level behind). A student who is more than one grade level behind would need a 1.25x teacher for four years, but would remain sub-proficient at the end of high school (see Table 1).

- We then multiplied the number of eighth grade students (3,680,000 according to NCES 2011 enrollment) by the percentage of students in each category to determine the number of students in each category (see Table 1).

- To determine the number of 1.25x teachers needed, we divided the number of students in each category by the high school math student:teacher ratio (~100:1, according to NCES) and multiplied by the number of years they would need a 1.25x teacher. This implied a need of ~91,000 1.25x math teachers to reach each sub-proficient student for as long as is necessary in high school.

- By assuming that 25 percent of today's 145,000 math teachers are 1.25x teachers (triangulated from MET 2012, "Gathering Feedback for Teaching"; The New Teacher Project 2012, "The Irreplaceables"; Education Trust – West 2012, "Learning Denied"; and Hanushek 2008, "Teacher Deselection"), we conclude that the system has ~36,000 1.25x math teachers today. Subtracting this from the ~91,000 needed, we arrived at a gap of ~55,000 1.25x math teachers.

- Repeating this calculation for reading and writing and averaging the results, we found a gap of ~56,000 1.25x ELA teachers.

Number of students who would still be sub-proficient even after being taught by a 1.25x teacher for each of their four years of high school

- Given a maximum of four years with a 1.25x teacher, any student can "catch up" by only a total of one grade level throughout his or her high school career. Therefore, only students who enter high school less than one grade level behind will be able to be proficient after four years of high school. Conversely, any student who enters high school more than one grade level behind will still be sub-proficient after four years of high school, even if that student is taught by a 1.25x teacher for each of those four years.

- Therefore, even in a system with nothing but 1.25x teachers, only 14 percent of students who enter high school sub-proficient in math would become proficient by the end of four years in high school. In total, 43 percent of students would be proficient in math after four years, and 57 percent would still be sub-proficient (albeit less so).

Endnotes

1 Alliance for Excellent Education, "Saving Now and Saving Later: How High School Reform Can Reduce the Nation's Wasted Remediation Dollars" (May 2011).

2 Anthony P. Carnevale, Nicole Smith, and Jeff Strohl, "Help Wanted: Projections of Jobs and Economic Requirements through 2018," Georgetown University Center on Education and the Workforce (2010).

3 U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Mathematics Assessments.

4 Robert Balfanz, "Putting Middle Grades Students on the Graduation Path" Everyone Graduate Center (2009).

5 For recommendations to states, along with case studies detailing what some states are doing in key areas, see National Governors Association, "Realizing the Potential: How Governors Can Lead Effective Implementation of the Common Core" (October 2011).

6 Achieve, "A Strong State Role in Common Core State Standards Implementation: Rubric and Self-Assessment Tool" (March 2012).

7 Robert Balfanz, Nettie Legters, and Vaughan Byrnes, "What the Challenge of Algebra for All Has to Say about Implementing the Common Core: A Statistical Portrait of Algebra I in Thirteen Large Urban Districts" (Center for Social Organization of Schools, Johns Hopkins University, 2012).

8 Major funders for the school creation effort included the Bill and Melinda Gates Foundation, Carnegie Corporation of New York, and the Open Society Institute. The evaluation by MDRC was supported by the Gates Foundation.

9 Howard S. Bloom, Saskia Levy Thompson, and Rebecca Unterman, "Transforming the High School Experience: How New York City's New Small Schools are Boosting Student Achievement and Graduation Rates, Executive Summary" (MDRC, 2010).

10 Howard S. Bloom and Rebecca Unterman, "Sustained Positive Effects on Graduation Rates Produced by New York City's Small Public High Schools of Choice" (MDRC, January 2012).

11 Cecilia Le and Jill Frankfort, "Accelerating College Readiness: Lessons from North Carolina's Innovator Early Colleges" (Jobs for the Future, March 2011).

12 http://ncnewschools.org/results/, accessed December 5, 2012.

13 Carnegie Corporation of New York, Parthenon and the Stupski Foundation, "Next Generation Learning: Introduction" (2011).

14 Heather Staker and Michael B. Horn, "Classifying K-12 Blended Learning" (Innosight Institute, 2012).

15 Brad Bernatek, Jeffrey Cohen, John Hanlon, and Matthew Wilka, "Blended Learning in Practice: Case Studies from Leading Schools" (Michael and Susan Dell Foundation and FSG, September 2012).

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