

# Future



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# Schools

## Blending face-to-face and online learning

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and  
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**T**he way the 1st graders hurtle toward their computer workstations, you'd think they were headed out to recess.

It's an unseasonably warm winter morning in San Jose, California, and the two dozen students at Rocketship Mateo Sheedy Elementary School get situated quickly in the computer lab, donning headphones and peering into monitors displaying their names. The kindergartners follow a moment later, until 43 seats are filled. The effect is of a miniature, and improbably enthusiastic, call center.

This lab—and the larger plan for the school surrounding it—has probably done more than any other single place to create enthusiasm for “hybrid schools.” Such schools combine “face-to-face” education in a specific place (what used to be called “school”) with online instruction. (Rocketship uses the term “hybrid,” rather than the increasingly prevalent term “blended learning,” because the computers are not actually “blended” with face-to-face instruction in the same classroom.) It's a sign of how young the hybrid and blended field is that this school at the epicenter hails all the way back to 2007. Rocketship Education, a small but burgeoning network of charter schools that serves an overwhelmingly low-income immigrant community in San Jose, has made a name through its, forgive the phrase, high-flying student performance. Two of its three schools are old enough to have test scores. They rank among the 15 top-performing high-poverty schools statewide, and the site that opened in 2009 was the number-one first-year school in the state in the high-poverty category. But what



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positions Rocketship on the cutting edge of school reform is its vision for how technology will integrate with, and change, the structure of the school. (Disclosure: Our firm, NewSchools Venture Fund, is a significant investor in the work of Rocketship and of several other organizations mentioned in this article.)

The scene in the computer lab represents the first steps toward realizing the Rocketship vision. In the lab, the 1st graders log in by selecting from a group of images that acts as a personal password, and then race through a short assessment that covers math and reading problems. Faced with the prompt “Put all the striped balls in one basket and all the polka-dotted balls in the other basket,” a student named Jazmine uses her mouse to move the objects to their places. Then it’s on to the core activity of her 90 minutes in the lab: a lesson on counting and grouping using software from DreamBox. The scenarios are slightly surreal—more objects to move, in this case mostly fruit, and the reward for getting it right involves an animated monkey bringing yet more fruit to a stash on her island—but she and most other students take on the task assiduously. It may be a lesson, but that’s not how Jazmine sees it. “This game is really easy,” she says. A bit later, she’ll read a book from a box targeted at her exact reading level, and make a return visit to the computer to take a short quiz about what she read.

Despite the kids’ engagement in the online lesson, no one is claiming that time in front of the computer is directly responsible for the extraordinary performance of Rocketship students. Rather, the online work is essential to the long-term vision for the school’s instructional model—and for Rocketship’s growth trajectory. Crucially, the lab requires an adult who has experience with children, but no teaching credential (nor, indeed, bachelor’s degree) is required. For this class, it’s a young mother named Coral De Dios, who dispenses help and order as the moment requires. Her ability to monitor the 43 kids here means that the school requires less staff, ultimately saving hundreds of thousands of dollars each year that can be plowed back into resources for the school, including staff salaries. In cash-strapped California, that’s no small matter.



But the larger impact of the technology is still ahead, in the ways it will integrate with, and alter, classroom practice. Rocketship is building a model in which kids learn much of their basic skills via adaptive technology like the DreamBox software, leaving classroom teachers free to focus on critical-thinking instruction and extra help where kids are struggling. Likewise, teachers will be able to “prescribe” online attention to specific skills. Part of the model involves providing teachers with a steady stream of data that will help them adjust instruction to kids’ specific needs, and to guide afterschool tutors. Today, those linkages between the computer lab and the classroom remain incomplete, in part because the data from various online systems aren’t sufficiently standardized; the many data points from different systems could be overwhelming to teachers.

Rocketship’s data guru, Charlie Bufalino, says that to date, vendors haven’t invested sufficiently in the R&D and technical fixes that would make a standardized stream of data possible and take menial tasks like attendance out of teachers’ hands. As more schools like Rocketship build hybrid and blended systems, however, and as more entrepreneurs develop the missing-piece systems, the tipping point may be reached, fueling rapid growth of this new approach to schooling.

Rocketship and the other school models we describe here offer a vision for what deeply integrated technology can mean for children's education, for the way schools are structured, and for the promise of greater efficiency amid a lengthy economic downturn. This is much more than simply taking a class online. Already, millions of children take one or more online courses, ranging from credit recovery to Advanced Placement. And there's a wide range of ways that the school facility and online learning—"bricks and clicks"—mix. (Michael B. Horn and Heather Staker offer an excellent guide to the landscape in their recent paper, "The Rise of K–12 Blended Learning.") Our interest is specifically in schools and platforms that use technology intensively and thoughtfully to tailor instruction to individual students' needs, and provide robust, frequent data on their performance. Most of our examples are high-performing charter schools, which have become a particular hotbed for the type of hybrid and blended models we are describing. Their designs call for bringing new productivity to the way schools deploy staff and dollars. They all share an ambition to prepare their students for success not just on tests, but in college.

### School of One

Much of the enthusiasm for the potential of blended learning comes from what is currently a math program. School of One, operating inside three New York City public middle schools, is an exciting experiment interweaving a wide range of online learning possibilities with classroom instruction.

**School of One had veteran math teachers codify the precursors and dependencies for each skill. They sourced more than 25,000 lessons for middle-school math, from which they chose the top 5,000.**

Indeed, a visitor needs only to walk into School of One's classroom space at Intermediate School 228 in Brooklyn to see what customized education looks like. The classroom is an open space that runs the length of the building wing, but is subdivided by bookshelves into workspaces where small groups of students work with the teacher or individually with laptops. The first sight that greets the eye is



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an airport-style video display, listing not cities and flights, but students' names and how they will receive their instruction during that period. For those who are starting on the computer, a press of a button will take them to a lesson provided by 1 of more than 50 content providers. Each lesson runs about half an hour, and students may switch from one content provider to another on the same skill. Others work in small groups with a teacher, who will typically oversee two or three groups of students, the content and groupings informed by data from the student's work online.

"You understand way better," says Edwin, a 12-year-old 7th grader clad in basketball-ready dark blue T-shirt, shorts, and

athletic shoes. Thanks to the unusual structure of math classes at School of One, he says, teachers work with only 9 or 10 students at one time, while at other schools, "the teacher doesn't have time to go over things with every student." He adds, "It's a really good program for kids who have trouble with math."

Behind the flashy images on the laptop screens, the real power behind School of One is in its brawny "back end"

systems, which enable the creation of real-time, hourly reports of students' progress and shortfalls. Teachers review these reports daily, both individually and in a collaborative planning period when they discuss the progress of individual students as well as student groups. Teachers can review the information before school, after school, during their prep period, or even while they are overseeing instruction (so they can identify the students in a group who, according to previous assessment data, may be struggling to learn a skill). "We get data every single day to help us understand what's working and what's not," says founder Joel Rose. When a student struggles on Tuesday, she can be assigned to a small group for help from a teacher on Wednesday, and with enough data and enough flexibility, it will even be possible to assign her to a teacher who is particularly good at teaching that lesson. It's a model that seems certain to make us question assumptions about how we organize classrooms and schools.

Like the teachers, students can see a map of their accomplishments. That map is tied to state standards and will later align with the Common Core standards. As at Rocketship, aligning lessons to these standards is no small matter; School of One had veteran math teachers codify the precursors and dependencies for each skill. They sourced more than 25,000 lessons for middle-school math, from which they chose the top 5,000. Many lessons were not included because they did not closely align to their map. School of One has enough faith in the power of its standards and assessments that it will soon offer students the option to press a "prove it" button that allows them to demonstrate mastery at an upcoming task and, if successful, skip it. The button stands as a testament to a core notion of the blended idea: learning that proceeds at a pace the student is ready for, rather than one set by the needs of an entire class.

## DSST Public Schools

The constant, real-time stream of student assessment data is a crucial element of the most promising tech-enabled schools, including some high flyers that don't fit neatly under the blended label. One of the most interesting is charter school network DSST Public Schools, named for its flagship, the Denver School of Science and

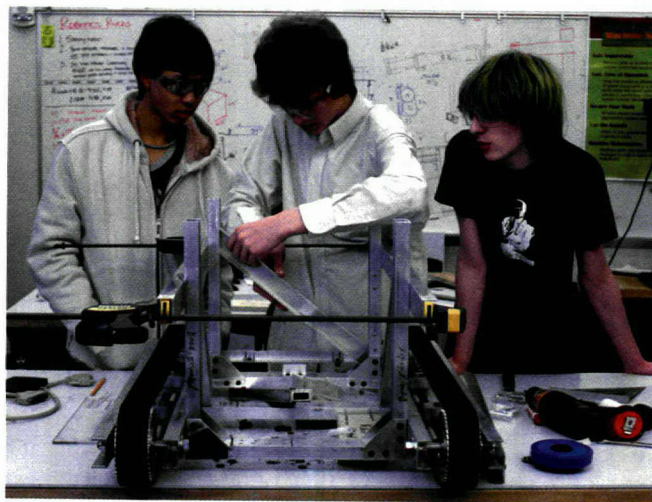


*Technology is everywhere as one strolls through DSST's Stapleton campus in northeast Denver, just barely within sight of peaks of the Rocky Mountains.*

Technology. DSST enrolls a mostly-minority, 47 percent low-income student population and has achieved national renown for its extraordinary results, including the second-highest longitudinal growth rate in student test scores statewide. Among graduates, 100 percent have been accepted to four-year colleges, where an astonishing 1 percent require remedial courses, in comparison to 56 percent for the Denver district. Technology is everywhere as one strolls through DSST's Stapleton campus in northeast Denver, just barely within sight of peaks of the Front Range of the Rocky Mountains. In a 6th-grade social studies class recently, students used collaborative user-

made web sites called wikis to access and respond to in-class and homework assignments. The teacher projected a map of Asia and posted prompts on the wiki for students to respond to as they learned about the geography of the region.

DSST's assessment system provides real-time, instant feedback to teachers and students on students' progress, measured through quick assessments that students take on netbooks. Teachers at DSST have been developing these informal assessments and in the 2010-11 school year are working with a consultant to review

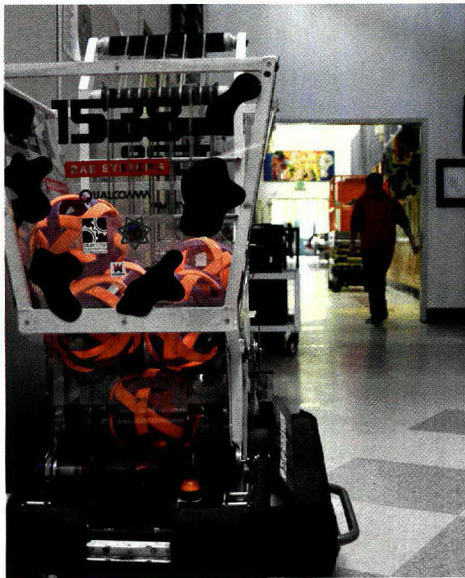


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the validity of the assessment items and gather feedback that will in turn make teachers better item writers. The data enable teachers to differentiate instruction and connect instructional strategies with student results. As at School of One, both teachers and students at DSST can track mastery on a particular standard. Teachers can quickly adjust groups and/or identify topics for re-teaching. Through these assessments and classroom observations, teachers identify students in need of extra support, who are then assigned to afterschool tutoring the same day. Teachers use the information to plan lessons, deciding whether to spend more class time on a certain area or focus on individual tutoring based on class scores. DSST is also using data to analyze teacher performance. “The technology enables us to collect good data on our school performance, which is used to drive and motivate student achievement,” says founder and CEO Bill Kurtz. “We believe that education innovation will be driven by common data.”

### Carpe Diem Collegiate High School

Elsewhere in the charter universe, schools are incorporating hybrid and blended structures into already successful school organizations, which increasingly seek efficiency, even as they expand and work to maintain excellent student achievement. The impact has been dramatic, for example, at Carpe Diem Collegiate High School of Yuma, Arizona. Carpe Diem represents what will likely be a crucial chapter in the story of blended schools: a turn to a blended model because of financial or facilities challenges. The charter school, which serves 250 mostly low-income students in



Hallways at High Tech High are lined by prize-winning robotics projects.

PHOTO COURTESY OF HIGH TECH HIGH SCHOOL

take online classes in a learning center that features 300 low-sided cubicles in one brightly painted room. Student cubicles have a desktop computer and monitor; many have been personalized and decorated with artwork. The learning center is staffed by the principal, two instructional assistants, and a course manager, who also talks with students about their progress.

Students begin their day by logging onto a software system called e2020 and accessing the calendar, selecting a subject area, and looking at their lists of assignments for the week. On any given day, based on the data, teachers may gather an entire grade or a subset of students, sometimes in groups as small as one or two. Some students work through all subjects each day, while others focus on math for the week on

one day, science for the week on another day. Carpe Diem has been a state leader in student growth for the past two years.

### High Tech High

Yet, even in schools that have been aggressive in incorporating technology, there is such a thing as too much in adopting blended approaches. Such is the case at High Tech High, whose campus near the San Diego airport is perhaps the most eye-poppingly technology-rich in the country. Rooms within the warehouse-sized buildings are delineated with glass walls 15 feet high, leaving the remaining space under the 25-foot ceilings for a chaotic crisscross of air ducts, structural supports, and wires. Mixed-media art hangs from every wall, door, and metal roof beam, and gee-whiz technology is everywhere. Students use the same computer-aided design systems that they would find in a professional design firm as they model real-life, design-forward

## At Carpe Diem Collegiate High School, students begin their day by logging onto a software system, accessing the calendar, selecting a subject area, and looking at their lists of assignments for the week.

6th through 12th grades, faced a crisis after losing its lease on a church building. Its founders radically transformed it from a traditional structure to one heavily dependent on online instruction, and in 2006 completed a facility tailored to the new model. In the reinvented school, small groups take classes directly from teachers, while most students

chairs. The hallways are lined by prize-winning robotics projects. And outside, students further their studies of air pressure by racing hovercraft they have designed using large circles of plywood with plastic-bag cushion edges and leaf-blower engines.

High Tech High has taken gentle steps into blended territory through its use of ALEKS, which bills itself as “a Web-based,



*High Tech High is perhaps the most eye-poppingly technology-rich charter school in the country. Mixed-media art hangs from every wall, door, and metal roof beam, and gee-whiz technology is everywhere.*

artificially intelligent assessment and learning system.” ALEKS, which runs on computers on the periphery of a 9th-grade classroom, provides teachers with detailed diagnostics, helping them to focus on the areas where students are struggling, and lets students take lessons at their own pace. A student logs on to ALEKS and begins by taking an adaptive assessment, each question chosen on the basis of previous answers. With this information, ALEKS develops a snapshot of a student’s knowledge in a given content area, recognizing which topics

confidence. He hastens to add that the technology augments, rather than replaces, the teacher. “Nothing,” he says, “can replace human interaction.” Danie’s teacher, Jane Armstrong, agrees, saying ALEKS gives her more flexibility in grouping students. Today, Armstrong has divided the class in two. Half of the students are using ALEKS while Armstrong is working with the other half in small groups. “This setting allows me to get to know all of my students,” she says. “If I’m just lecturing them, I don’t get to know what they’ve mastered.”

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he has mastered and which he has not. This information is represented for both the student and teacher by a multicolored pie chart, which is constantly being updated as the student masters new topics. Once a student has mastered a specific topic, new ones become available for the student to choose from. “It doesn’t slow you down,” says Danie, a 15-year-old boy with a dark mop of hair that he regularly brushes off his forehead. Danie, wearing untied high-tops and faded black jeans, confesses matter-of-factly that he is repeating the 9th grade. “Students learn at different speeds,” he says with marked

California’s budget situation today is nothing short of disastrous. Yet High Tech High recently rejected a much more aggressive move into the blended field, a “flex” plan that would have brought students to campus only once a week, with the other four days spent online, typically from home. The plan would have created enormous cost savings by allowing five different cohorts of students to use one building each week. Yet teachers, students, and parents rejected the idea of giving up the daily campus experience, and teachers were not enthusiastic about doing a large

proportion of their teaching online. “We’re not drinking the Kool-Aid,” said founder and CEO Larry Rosenstock.

### On the Verge

Indeed, it seems likely that, just as happened with charter management organizations, rapid growth will take place only when the pioneers can demonstrate proof points of excellence in student performance. “In order for there to be larger market traction, the overall industry has to see more results,” says Anthony Kim of Education Elements, a nascent firm that designs the technical back end for blended schools. “We’re at the very early adopter stage right now.”

Blended schooling is dawning at a time when, as recent public opinion polls show, people are open to online learning. According to the 2010 EdNext-PEPG Survey (“Meeting of the Minds,” *features*, Winter 2011), support for online coursework jumped 8 to 10 percent in a single year. Yet as much as anything, the blended effort is being driven by a new fiscal reality. In a widely regarded speech at the American Enterprise Institute called “The New Normal: Doing More with Less,” education secretary Arne Duncan noted that a loss of housing valuation meant

that education funds are down sharply and aren’t coming back anytime soon. In the spirit of never wasting a crisis, he said he hoped the difficult financial straits would help bring an end to “the factory model of education” and an increase in productivity in schools. He said, “Our schools must prepare all students for college and careers—and do far more to personalize instruction and employ the smart use of technology.”

Is the blended school the model he’s looking for? Tom Vander Ark, a former head of education for the Bill & Melinda Gates Foundation and now a partner in a private equity fund focused on education innovation, thinks so. In the past, technology actually made schooling *more* expensive, as computers were layered onto an existing model without adding any efficiency. Technology-driven productivity, he says, stands to change that. “We can make learning far more productive,” says Vander Ark. “It’s the first chance in history to change the curve.”

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