



ST. VRAIN'S MARCH TO EXCELLENCE:

A Colorado School
District Reflects on its
Transformative Decade

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**SCIENCE
TECHBOOK.**

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ight years ago, this Colorado district started a STEM revolution. Today, its students, with projects that stretch from building robots to helping save an endangered species of frog, are reaping the benefits.

St. Vrain Valley Schools in Colorado is on a roll.

In just under a decade, the district of 32,000 students has transformed itself through a variety of initiatives to provide students with a hands-on education that sets them up for success well beyond the halls of their schools. During this time, the district launched an Innovation Center, where students use their STEM knowledge in real-world projects; it opened a P-TECH school that allows students to earn an associate's degree and high school diploma in six years; it has pulled in more than \$20 million in national and state grants for a variety of programs; and its list of public-private partnerships has expanded to encompass national companies such as Lockheed Martin, Apple, and IBM. If that's not enough, the district, located about 35 miles north of Denver, has netted nearly 90 awards for its academic programs in the past five years, and it regularly hosts visitors from other school districts and corporations.

While outside recognition is great, St. Vrain has also garnered the approval of the 13 communities that comprise the district. Last year, voters overwhelmingly approved the district's financial plan, agreeing to a \$260 million bond that will allow the district to build four new schools while expanding the footprint of another 29 schools—no small feat for a school district in Colorado, where the purse strings are tightly controlled by the state. Parents effectively bought into the process of transforming the district to help raise their children to new heights.

The road to the district's success began about a decade ago. Examining the steps district leaders took reveals how administrators made deep cuts in legacy resources to invest in new avenues, and launched new innovations, ensuring improvements were instituted districtwide instead of just school by school, while always continuing to push for improvements.



Superintendent Dr. Don Haddad with St. Vrain elementary students.

"Our systematic approach is very unique," says Superintendent **Dr. Don Haddad**. "What we've done is establish a pre-K–12 system where every one of our schools is focused on the things that we know work."

Haddad highlights the core components of St. Vrain—a districtwide 1:1 program, STEM studies that start at pre-K and run into higher education, curricula that push students to problem solve and employ critical thinking skills, a "design thinking" mindset from administrators, public-private partnerships, and effective professional learning that reinforces all these ideas.

"That's what makes the system work. What you see as a result is systematic gain. It's not limited to one school—it's districtwide," he adds.

When former Secretary of Education **Arne Duncan** visited the district's Skyline High School in 2014, he agreed: "This is a remarkable success story. This is how students should be learning around the country."

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All of these investments are coming online just in time, as the district is adding 800 new students each year, making it one of the fastest-growing school districts in the state.

THE FIRST STEP

The district's first move in reinventing itself was building a comprehensive plan to support a variety of programs related to 21st-century careers. The programs focused on STEM, medical and biosciences, international baccalaureate, aerospace, and energy, among others. The idea was to create schools of choice for students, allowing them to pursue pathways they were passionate about, which could lead to interests in college and eventually a career.

These initiatives, in concert with a plethora of programs such as music, art, and athletics, made for a strong, comprehensive direction for the district, said Haddad.

Officials created a STEM Academy at Skyline High School, one of its 10 high schools, using STEM to both engage learners and interest them in pursuing postsecondary education. The academy quickly outpaced those modest goals and set into motion a series of domino-like changes that have transformed the district into a national leader.

The short timeline to prominence at St. Vrain began when the district reeled in a \$3.6 million Investing in Innovation federal grant in 2010, just one year after Haddad was named superintendent. That grant helped establish the STEM center, but also led to a longer school day for at-risk students in four elementary schools and an intervention program designed to help middle school students in danger of failing math.

The improvements from those funds led to an even bigger prize when St. Vrain was one of 16 Race to the Top winners. The federal \$16.6 million award allowed the district to expand its STEM studies to all the schools that feed Skyline High School and to pursue creating Pathways in Technology Early College High School (P-TECH) with IBM.

Starting in 2016, St. Vrain was one of the first districts to partner with IBM on P-TECH outside of the original Brooklyn school in New York. This program offers students a chance to earn a high school diploma and an associate's degree in a six-year block. The college courses are free for students, and partner IBM offers graduates interviews for jobs that pay \$50,000 a year.

This work culminated in St. Vrain being named one of the 100 Future Ready school districts in the

country and Haddad being named superintendent of the year in 2013 by the National Association of School Superintendents.



FIXING FUNDING

All this positive momentum in St. Vrain came after the district's darkest days in 2002. That's when a perfect storm of accounting errors, lower-than-expected revenues, and higher-than-expected expenses resulted in the district facing a \$13.8 million shortfall on what was then a budget of \$130 million.

With the state's help, the district began a wide-ranging plan that included a 15 percent cut of its non-salary budget, a 45 percent slash to administrative costs, and a rollback of promised teacher and district employee raises (which teachers were supportive of in order to help the district through this difficult time). The state also loaned the district \$28 million and agreed to buy (and lease back to the district) a building for \$4.8 million.

By 2005, things were looking better. The district was still recovering from the financial crisis, but it had implemented sound financial processes and procedures. In addition, the district received an excellence in financial reporting award from the Government Finance Officers Association.

However, the district was in need of additional local funding through a process called a mill levy override, which could only come after approval from local voters. And though the district had made strides in securing state funding, it still needed to win over locals with its vision for St. Vrain's future.

In 2004, the district had lost a mill levy override by just 159 votes. The next year's effort was rejected by 54 percent of voters. So when another mill levy override was suggested in 2008, the school board knew that gaining the trust of the community would require the involvement of the community. The board would not attempt another mill levy override unless they had the support of the community.

The board told parents: "If this is important, then do something about it," recalls **Laura McDonald**, the parent of two St. Vrain students.

McDonald and a small group of parents accepted the challenge from the school board and launched what eventually became Grassroots St. Vrain, the leading community arm of the 2008 campaign for a \$16.5 million mill levy override, which would later pass with 57 percent of the vote.

"We always have funding challenges, so that's why it's important to engage the community so that you not only limit the problems, but step over them."

McDonald admits the group's leaders had a "tip of the iceberg" level of knowledge about school funding when they started. But the leadership was strong, and the school district did not want to lose the community momentum. In 2009, the school district partnered with community leaders to create Leadership St. Vrain with the goal of helping community members deepen their understanding of the business of education.

These community members agreed to meet for three hours each month for nine months to learn

about the inner workings of the school district, including who the state-level decision makers were, down to what curricula were used in classrooms. Only one of these sessions was focused on school funding, but McDonald says a subgroup of the initial Leadership St. Vrain group decided to formalize Grassroots St. Vrain into a nonprofit organization focused on school funding issues.

Just as St. Vrain was coming out its financial difficulties, the state found itself in a deficit. In 2010, Colorado ultimately decided to reduce per-pupil spending back to 2006–07 levels, cutting about \$14 million from St. Vrain. The district absorbed the cut by slashing budgets 25 percent, freezing textbook adoptions, and pushing the adult basic education program outside the district's purview.

Thanks to its community challenge during the 2008 mill levy override, and the continued community education through Leadership St. Vrain, the district had established a new partner as it tried to stabilize its funding—Grassroots St. Vrain. This nonprofit group, created by parents, is committed to advocating for school district improvements by both explaining and supporting mill levy overrides that allow the district to add funding to what the state provides.

Grassroots has become a reliable resource of facts about various school funding topics, McDonald says, giving the group lasting power in the community. Grassroots has made videos to help explain the state funding formula, local initiatives, and yes, even where marijuana tax money goes in Colorado (mostly to cover an increase in state services, with some going to school districts).

The financial uncertainty over the years actually led the district to build a more stable system. In 2012, hard work by the district and Grassroots paid off again. St. Vrain passed a \$14.8 million mill levy override that gave teachers raises, maintained class sizes, and helped fund preschool for low-income students. In 2016, voters in the district easily passed a \$260 million bond issue, with 59 percent of voters approving.

As of the 2015-2016 school year, St. Vrain's general fund per-pupil expenditures were \$8,584. The district's \$252 million in general fund expenditures were funded almost equally between state and local sources. Those two groups account for the majority of the district's general fund revenues, with federal grants accounting for just one percent.

Still, McDonald says, “Relying on local mill levy overrides is not a good solution.” While St. Vrain is fortunate to have passed its last two overrides and bond issues, this isn’t possible for many other districts, because they may not have the needed political support or property tax value, she adds. That’s a big reason Grassroots St. Vrain focuses much of its work on looking at state-level solutions.



Greg Fieth, St. Vrain's chief financial officer

“The fact that we stabilized our funding helped us move forward with the transition,” says **Greg Fieth**, the district’s chief financial officer.

“We always have funding challenges, so that’s why it’s important to engage the community so that you not only limit the problems, but step over them,” says Haddad.

GETTING BACK ON TRACK

In 2009 Haddad was promoted to superintendent, and he and his team quickly realized that they were leading “a district of schools versus a school district.” Within a district that covers 411 square miles, there was a lot of inequity between the 55 schools, he remembers.

“You could go to any of our schools and you would find huge variances in programming, wide swings in technology, and disparities in the quality of the facilities,” he said.

Remedying that imbalance became a top priority for his administration. Plans were already under way to use the funds from a \$189 million bond to renovate and make over the district. The superintendent insisted on achieving “total equity” in schools across the district.

The district went a step further under the leadership of **Tori Teague**, the assistant superintendent of curriculum

and instruction. Teague led an effort to reorganize curricula, eliminating the typical gaps between elementary, middle, and high school. Once this was completed, the district was ready to tackle the needed infrastructure improvements that could pave the way for the later digital transformation.

Joe McBreen became the district’s chief technology officer the same year Haddad became superintendent. He recalls that even during the district’s lean years, it invested in fiber optic networks because officials knew technology would be important to the future of the district.

But in St. Vrain, “it’s not as simple as putting in a fiber line and having it hit every school,” says Fieth. Comprising 13 communities and 411 square miles of territory means it’s necessary to work with each of the municipalities to ensure every building has access to a fiber-optic network and wireless network capability in each classroom.

STARTING THE TRANSFORMATION

With finances stabilized and an infrastructure in place, the district was ready to make changes that would intensify the impact on students in its classrooms. Over four years, the district provided all students in middle school and high school with iPad minis. Elementary classrooms received five to seven tablets each.

“When it came time to look at the technology piece, it was easy to decide this was the next layer of that, and we implemented it across the board. We looked at digital curriculum, because that is an easy way to implement the technology. We really see these devices as extensions of collaboration,” said Teague.

Right from the beginning, the district made sure professional learning was a key part of any technology upgrades. “Even in the leanest budget years, we made it a priority that 20 percent of any tech investment would go toward professional development,” says Fieth.

“We were intentionally aware of avoiding the ‘bright shiny object’ syndrome,” says McBreen. “Teachers can become enthralled by the latest, greatest technology, but it’s about purpose.”

Adam Wellington, an eighth-grade social studies teacher at Coal Ridge Middle School, details how the support helped teachers during those early days of integrating

technology en masse. Getting the iPads three to four months before students afforded staff extra time to work with instructional tech coordinators, helping them pivot from delivering information to guiding students to finding information themselves.

Wellington's school also holds "tech slams," where teachers take a minute or two to share a new tool they are using in the classroom.

"It's a very open environment, and it's helped our staff see the benefits of what technology can do," he adds.

Presenting the material in a new way can boost student understanding, too. Wellington says the district's move to use Discovery Education's Techbook "has really changed how our students can understand our curriculum."

As soon as the district got teachers familiar with tablets, they quickly realized that parents needed a crash course, too. "We found that parents didn't know exactly how to get students to turn off the devices and disengage," said Teague.

Eventually St. Vrain started a Camp iPad for parents, where students would show what they were doing with the devices. A tech newsletter was also distributed, and the district hosted technology nights at schools to orient parents to the new devices.

"I think that first year we had a lot of questions continually come up. [Now] it's almost gotten down to zero," Teague says. "I think it's critical that you're very proactive with parents in any technology implementation. If a school district doesn't do that, it will fail."

Investing that time with parents made a huge difference for St. Vrain, garnering goodwill that spread beyond the scope of technology instruction, says Teague.

"What's really cool about it is that it creates equity across the system," she said. "For some families, they have not had any technology at home, and now all their kids have iPads. Kids can share it with parents, and families cherish it."

LEARNING IN THE GREAT OUTDOORS

While expanding their learning horizons through a districtwide 1:1 transition, students at St. Vrain schools have also been engaged in ambitious activities outside the classroom. Through a series of community outreach efforts, St. Vrain's high school students are working

with scientists, park rangers, city officials — even shark researchers. They're receiving a science education with a career context and learning how science can be applied in real life, filling them with newfound focus and experiences they can apply back to their classroom studies.

Michael O'Toole, the K–12 science coordinator at St. Vrain Valley schools, has a vision for how STEM studies like these can be applied across all subjects to build a stronger foundation for future learners.

"We're fortunate to have a 1:1 environment, in which our secondary students each have an iPad, but we are still committed to a hands-on science experience," said O'Toole.

O'Toole has taken his environmental learning to vistas like Tanzania and Mount Kilimanjaro, sharing excursions with other learners online. On one particular trip in 2015, students from Nigeria, Oman, South Africa, Tanzania, and the United States explored the unique biomes and the summit of Kilimanjaro. As students planted their feet atop the 19,341-foot summit, other students from all over the world watched online, expanding the scope of environmental learning.



St. Vrain students experiment with a VR headset in class.

"In science we have an opportunity to become citizen scientists, where students not only learn, but help contribute to something bigger than themselves," he said. "All of this contributes to the overall knowledge of our community and planet as well as giving students real-world experiences."

St. Vrain's educators are finding new ways to use Discovery Education Science Techbook as a platform to enhance the hands-on experience of students, he said.

"We are always looking for ways to incorporate 21st-century skills such as creativity, critical thinking, and collaboration. This mindset allows our teachers to push past previous limits of traditional educational practices, unleashing the learning and contribution potential of our future scientists," said O'Toole.

SECURING NATIONAL GRANTS

A key piece of St. Vrain's transformation clicked into place as the district started to gain national recognition, and funding, to help propel its improvements. The first instance of national acclaim occurred in 2010 when the district earned an Investing in Innovation grant from the U.S. Department of Education. These coveted awards, known as i3 grants, were created in response to the recession of 2009 in an effort to help supplement school spending and to fund experiments that aimed to improve the achievements of disadvantaged students.

In the first year, awards were open to individual districts instead of states. St. Vrain's application was one of 1,700 to vie for a portion of the \$650 million fund. More than 300 judges pored over the applications, rating them on a 105-point scale. St. Vrain got the top score of all the applicants, garnering a \$3.6 million grant over five years.

One little known part of the i3 grants was that grantees needed to match at least 20 percent of the award with funds from the private sector. For St. Vrain, that meant getting \$721,000. Ridgeview Communications, a telecommunications company, agreed to provide \$734,000 of in-kind donations over five years. This included internet access, consultation with district officials, and technical support. IBM also stepped up, contributing \$215,000 worth of software to the seven schools named in the grant. IBM went a step further, donating software to 14 other St. Vrain schools, although that total of \$436,000 couldn't be counted to match the i3 grant.

After launching the STEM Academy within Skyline High School, which focused specifically on engineering and computer science, Haddad recalls that their district was becoming more visible.

"People were paying attention to what we were doing and different companies were wanting to provide support," Haddad says.

Teaming up with the University of Colorado Boulder's School of Engineering to create the academy, St. Vrain administrators started by identifying the skills needed to be successful in college. **Patty Quinones**, who was then the school's principal and is now the district's assistant superintendent of innovation, worked backwards to translate the end goals into curricula that met the state's academic standards. Program graduates with good grades were guaranteed entry to CU's College of Applied Sciences.



Patty Quinones, St. Vrain's Assistant Superintendent of Innovation

About 240 students have graduated from the STEM Academy in its eight years, and nearly 40 percent of them have gone on to STEM-related postsecondary programs. The graduation rate for the academy has jumped four percentage points, to 81 percent.

As impressive as St. Vrain's i3 win was, it was only a warm-up for what was to come. While 49 organizations and districts won i3 grants, St. Vrain was about to join even more exclusive company two years later. With an application based on the same STEM program that netted the i3 award, St. Vrain won a Race to the Top (RTTT) grant in 2012, grabbing \$16.6 million. This time the district was one of 16 winners out of more than 350 applications.

The RTTT grant focused on programs related to technology, professional development, extending the school year, and Skyline High School's STEM program. It also helped bring that program to the high school's seven feeder schools, which served many of the district's minority students and English-language learners.

As good as this progress was, district leadership recognized that something was missing. The district put together a robust STEM curriculum, which included project-based learning and working with engineering students and faculty from the University of Colorado's Boulder campus.

CREATING THE INNOVATION CENTER

The goal for the district's newly created Innovation Center was simple, but challenging. The district wanted students to use the center to stretch themselves by mixing their creativity with top-notch tools to work for clients outside the school district.

St. Vrain's Innovation Center began three years ago. The 6,000-square-foot center is located at the district's career development center. It's stocked with a bevy of tools students can use for their various projects, including a technology lab, an electronics lab, and fabrication and wood tools. The center also includes high-end industry equipment, such as a laser cutter, five 3D printers, and a scanner. Perhaps the most eye-popping tools in the center are the Nao programmable humanoid robots. These 23-inch-high robots have been used everywhere, from Rensselaer Polytechnic Institute to the French Institute of Health and Medical Research, where they were used to train International Space Station crews and assist elderly patients.

Not only do students take high-end courses and gain industry certifications through their work at the center, those working on projects for clients earn \$10 an hour.

"It expands their opportunities and skill sets," Quinones adds.

For example, the center is the only school of its kind in the country where students can earn Apple certification for technicians. Successful students can walk out of high school and earn \$45,000 working for Apple or third-party companies, but St. Vrain encourages the students to attend college and work at fixing Apple products while there. In this way, students also leave college with a solid work history.

This year, 24 students gained the certification, and the group worked not only for the district but also for the city of Longmont. Students help the district roll out technology, and they conducted workshops to train Longmont firefighters and policemen how to use new iPhones.

Perhaps the best manifestation of the type of work that students complete at the center is the project that has students working to save an endangered frog in Bolivia and Peru. The students built an underwater remotely operated vehicle (ROV) that they named Thelma. This device can go twice as deep as a scuba diver, and it

is equipped with sensors that can record the water's properties.

"Our students not only built the underwater ROV, but they also communicate with the marine biologists [using the device]. Because some students are bilingual, they communicate with the scientists directly," Quinones says.

While district staff oversee student work and keep projects on track, the more important oversight comes from outside experts. The project lead initiates the logistics and sets timelines, and students fill out timecards. Because they get paid, all students are run through the district's human resources department.

Students have built robots, done computer programming, designed apps and websites, and even served as beta testers for companies.

"We've made huge differences for students who didn't see themselves going to college or becoming engineers, mathematicians, or scientists."

As good as the center's results have been in the first three years, the district is excited about the future. Thanks to \$20 million from the \$260 million bond initiative that passed last year, the center will be getting its own stand-alone building for the next school year. The 50,000-square-foot center will be able to serve all of St. Vrain's 55 schools.

In addition to the high-tech tools the district already deploys, the center will have four new components. An entrepreneurial zone will allow students to hone small-business skills, while a "pitch room" aims to replicate the SXSW Accelerator product demonstration spaces, and a biomedical engineering lab will allow students to work with various higher education partners. In the center's new aeronautics division, students will be able to create ROV projects, conduct flight testing, and build drones.

"Our team visited Stanford Design School, and many of the things that we saw served to inform us as we built this program," said Haddad.

"I feel like St. Vrain and the Innovation Center have definitely changed students' pathways for higher-paying jobs and better opportunities to look at their choices of careers," Quinones says. "We've made huge differences for students who didn't see themselves going to college or becoming engineers, mathematicians, or scientists."

PUBLIC-PRIVATE PARTNERSHIPS

The crown jewel for St. Vrain is the creation of over 60 partnerships with large companies such as IBM, Apple, and Toyota. Other prominent partners include **OtterBox**, which makes durable cases for mobile phones; **Aldebaran Robotics**, which makes the humanoid Nao robot; **Esri**, a GIS mapping software company; **Sphero**, a Boulder-based company that makes app-connected toys; **SparkFun Electronics**, a Colorado-based maker of microcontroller development boards; and **Red Idea Partners**, a consulting and venture capital company in the food, technology, and consumer markets.

The evolution of St. Vrain's partnership with IBM helps illuminate how the best collaborations not only serve the company and the district, but also can deepen over time. IBM is a neighbor of St. Vrain, with a massive facility in nearby Boulder. IBM created its 500-acre Boulder facility in 1965; it includes 2.5 million square feet of space and 26 buildings.

The district expanded its partnership with IBM in 2009 when the company recognized the excellence and potential at St. Vrain. IBM agreed to in-kind donations to the district for the i3 grant in 2010. When St. Vrain went after its Race to the Top (RTTT) grant in 2012, IBM upped its involvement with the district. District officials asked the company how they could help interest their youngest learners—kindergarten to second grade—with STEM and science programs.

"We looked at each other and thought 'Whoa,'" says Ray Johnson, IBM's corporate citizenship and corporate affairs manager. "It was a great idea."

IBM and St. Vrain agreed to create a two-week Innovation Academy for a Smarter Planet. The program, run with the University of Colorado, targets elementary school students and runs during the summer months. One project, designed by fourth graders, is a "nonbullying social media app" that can tag objectionable language.

The program marks its seventh year in 2017. This year 240 students attended what one teacher calls "engineering summer camp." Students spend one week at an IBM training center and the second week refining their prototypes at St. Vrain's Innovation Center. From this work, district officials, with help from three IBM representatives, have now created a STEM preschool.

"I always say we don't give kids, especially young kids, enough credit for what their minds are capable of absorbing at such a young age," Johnson says. "They are like sponges. At the end of two weeks, second-graders are using terms like prototype."

Talking about the deep partnership between the district and the company, Johnson says St. Vrain has been an aggressively innovative district.

"That made it easy for us to see what they wanted to accomplish and let them know what we wanted to be part of," said Johnson, adding that like most companies, IBM is happy to offer intellectual expertise more than just a check, because that is where true value lies.

IBM's involvement with St. Vrain went up another notch when the two, along with Front Range Community College, opened the first of three P-TECH 9-14 schools in Colorado last year. That school, Falcon Tech, has a six-year program that allows students to earn both a high school diploma and an associate's degree in four to six years, at no charge to the student. The school features integrated high school and college coursework, along with rich workplace experiences, including mentoring, site visits, paid internships, and "first-in-line" job interview opportunities from IBM.

"It's a real boost for the economy, because you're creating a talent pipeline for a number of industries, and it's a boost for the school districts. Graduation rates go up, and kids get the attention and support to earn a college degree and be ready with the skills required for 21st-Century careers," Johnson said.



STUDENT ACHIEVEMENTS

So with all this progress, how are St. Vrain's students doing? By a variety of measures, the needle is pointing up. In 2017, students achieved the highest average ACT scores in the district's history, and they took 3,500 AP tests, an increase of 1,000 tests just from last year. The district's graduation rate jumped 3 percentage points in the last year alone.

The district's English language learners and special education students do still face a significant achievement gap. Given that ELL students are 15 percent of St. Vrain's student population and special education students 10 percent, this is a significant number of students. In the district's accreditation rating, the district met the performance indicators in both academic achievement and academic growth at its elementary and middle schools. In its high schools, the district's results are labeled "approaching" in achievement and growth.

Haddad prefers to look beyond just state test scores to get a full picture of the district's health and its trajectory. The news there is also good.

"Discipline rates have plummeted and enrollment, a true test of what you're offering, is skyrocketing. Kids are coming to St. Vrain in droves," he says.

The district leader goes outside the numbers to highlight the top reason for the district's growth.

"Our district's overall success is a result of all stakeholders, including the students, the teachers, the classified staff, the parents, the business community, and the elected officials, coming together to make a strong statement that educating our children is our top priority. And we in the St. Vrain Valley Schools could not be more grateful to the community for their support.

"That's at the heart of why we're so successful," said Haddad.

