

# A NEW MILLENNIUM IN EDUCATION

## Duke School Paves the Way

By Emily Gaines Buchler

The verdict is in: the federal government wants schools to provide a 21<sup>st</sup>-century education. Not a 20<sup>th</sup>-century education, mind you, nor one that harkens back to the 19<sup>th</sup> century. The year is 2009, no?

This label—21<sup>st</sup>-century education—pops up everywhere, from blog posts and news reels to President Barack Obama’s speeches about education. Yet many of us wonder what it means, exactly, and why the need exists to pinpoint the century. After all, most of us know that we live in the third millennium.

Though used across circles that span policymakers, entrepreneurs, scholars, and educators, the term 21<sup>st</sup>-century education implies much the same thing: that the world is changing rapidly, and we’d better prepare future generations to keep up with it. Doing so, proponents say, requires a skill set not found in traditional schools, which focus more on the important but inadequate three Rs—reading, ’riting, and ’rithmetic. What students need today, they suggest, are skills like problem solving, critical thinking, creativity, and collaboration. Only then will students become active participants in a world that needs their help—to solve the climate crisis, to fix the economic mess, and to tackle the endless other problems, and prospects, at work in the world.

Duke School, since its founding as a laboratory school for Duke University in 1947, has focused on high-level skills. The school’s current mission statement espouses to foster “independent learners who solve real-life problems and work cooperatively with others,” and its project-based approach to learning fits right within the guidelines of a model 21<sup>st</sup>-century school. Much, in fact, of what Duke School offers—and has



offered for years—meets the parameters of a 21<sup>st</sup>-century education, from its integration of technology to its new custom-made classrooms that accommodate shifting needs. It is as though the field of education, rather than pushing Duke School in a new direction, has finally caught on to what the school has known, and practiced, for years.

This statement—that Duke School rides ahead of the gang—comes from a long-held philosophy perfected in over fifty years of practice. Establishing a real 21<sup>st</sup>-century school requires hard work and resources; it does not happen overnight. And while other schools are just beginning to break out of more conventional molds, Duke School is at the vanguard, continuing a time-honored history of research-based instruction, while building on the burgeoning body of scholarship pursuing a likeminded mission.

Here’s what the experts say about the future of education—and how Duke School keeps up with, and ahead of, the times.

### Enter: Real World

A first goal of any 21<sup>st</sup>-century school is to prepare students for real-world success. This aspiration might seem obvious, yet for decades schools have focused on other things, such as, standardized tests and getting through the textbook. These focal points no longer make the cut, scholars say.

According to the Arizona-based Partnership for 21<sup>st</sup> Century Skills (P21), which aligns schools with the needs of leading companies across the country (Apple, Cisco, Dell, Microsoft, and others), the United States education system fails to prepare students for the changing world. According to their Web site:

There is a profound gap between the knowledge and skills most students learn in school and the knowledge and skills they need in typical 21<sup>st</sup>-century communities and workplaces. To successfully face rigorous higher education coursework, career challenges, and a globally

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competitive workforce, U.S. schools must align classroom environments with real-world environments by infusing 21st-century skills into their teaching and learning.

Most of P21's work involves strategizing how to teach 21<sup>st</sup>-century skills, which they, like countless other organizations with parallel missions, define as creativity, innovation, problem solving, critical thinking, and collaboration. These competencies, P21 suggests, "are the lifeblood of a productive workforce in today's global, knowledge-based economy"; they are also critical in "improving our nation's competitiveness," P21 stresses.

Like P21, other educators are partnering with industries to find out precisely what students need. Harvard education professor Tony Wagner, for instance, spoke with hundreds of people in businesses and non-profits—and then spent months observing in classrooms to see how our schools stack up. His findings reveal the same thing: that our schools aren't preparing our students, even those in the nation's most highly regarded school systems. Wagner writes:

Across the United States, I see schools that are succeeding at making adequate yearly progress but failing our students.

Increasingly, there is only one curriculum: test prep. Of the hundreds of classes that I've observed in recent years, fewer than 1 in 20 were engaged in instruction designed to teach students to think instead of merely drilling for the test.

Wagner offers solutions in the vein of 21<sup>st</sup>-century learning:

To teach and test the skills that our students need, we must first redefine excellent instruction. It is not a checklist of teacher behaviors and a model lesson that covers content standards. It is working with colleagues to ensure that all students master the skills they need to succeed as lifelong learners, workers, and citizens. I have yet to talk to a recent graduate, college teacher, community leader, or business leader who said that not knowing enough academic content was a problem. In my interviews, everyone stressed the importance of critical thinking, communication skills, and collaboration.

Closer to home, a number of efforts are underway to connect schools with the workplace. At Cisco's southeast U.S.

headquarters in Research Triangle Park, the multi-national telecommunications company collaborates with North Carolina teachers to design and implement math, science, and technology lessons. Part of the Cisco Learning Institute, which reaches out not just to school-aged children but also to professionals, partners with teachers to integrate technology into the classroom, allowing Cisco to play a role in shaping the next generation of workers. "We believe that successful educational experiences positively impact the social fabric of our nation and world," they say. "[Our] intent is to collaborate on solutions that result in student success as impacted by teacher depth of knowledge and quality of practice ... [All of this is] critical in addressing the needs of education in the 21<sup>st</sup> century."

Many of the current industry-education partnerships emphasize math, science, and technology skills, while also calling for more competency in collaboration and communication—writing, speaking, listening, presenting, performing, and the other ways, many technology-based, that people connect worldwide. Duke School, far from ignoring content areas like literature and the arts, has taken big steps to integrate the kind of math, science, and technology initiatives called for by leading educators. In 2008, the middle school launched a new learning program called STEM (Science, Technology, Engineering, and Mathematics). Based on best practices in education research—and part of an initiative to prepare U.S. students for the global workforce—STEM integrates technology and engineering into math and science classrooms. Duke School is one of a handful of middle schools across the country using STEM as an integral part of its math and science curriculum.

Duke School's lower school also helps students hone skills needed in the 21<sup>st</sup>-century workplace. "The scientific process is the foundation of the entire Duke School curriculum," Director of Curriculum Kathy Bartelmay explains. "Students learn to follow the process used by real scientists: they

make observations about the world around them, develop predictions, devise experiments, collect data, draw conclusions, and formulate new questions.”

One morning last fall, Duke School parent Joe Horrigan formed a similar impression of the school’s approach to science. He witnessed dozens of second graders—most less than four feet tall—conversing like professional scientists over the intricacies of butterflies and moths. Horrigan, a child psychiatrist who develops new medicines at GlaxoSmithKline, knows a thing or two about science.

“I walked into the classroom and saw second graders using both sides of their brains,” remarks Horrigan. “They were able to use their own data to formulate and defend their own conclusions. They were not keying off a textbook or the teacher’s mouth. And they never once answered *I don’t know* when I challenged them about their results. That’s remarkable.”

Adds Horrigan: “These second graders engaged in a set of intellectual behaviors that mimic what we expect our scientists to do at GlaxoSmithKline. The funny thing is, these critical capacities of analyzing data, reaching independent conclusions, and using critical thinking are not always prevalent in the workplace. But they’re being used and cultivated at Duke School.”

### Educating the Whole Child

Just as *whole foods* have taken the food industry by storm, so too has the idea of the *whole child* entered the field of education. It is no longer enough to use school as the place to foster academic skills and home as the place to build character. Now, proponents of 21<sup>st</sup>-century schools say, educators must cultivate the *whole child*, not just the child who fills in bubble sheets and memorizes by heart the first stanza of “Paul Revere’s Ride.”

What does educating the *whole child* entail? According to the long established and reputed Association for Supervision and Curriculum Development (ASCD), which, in 2007, launched an advocacy campaign called



the Whole Child, the term encompasses not just the academic needs of children but also their social, emotional, and physical well-being. ASCD’s rationale puts it plainly:

If students are to master world-class academics, they need to be physically and emotionally healthy. They need to be well fed and safe. They need to be intellectually challenged and have supportive adults who know them well and care about their success. And they need to be interested and engaged in what they are learning. It is common sense—a hungry student can’t learn, a scared student can’t think, and a student

who is bored or intimidated by schoolwork will just slip through the cracks.

With data going back ten years, ASCD’s Whole Child initiative backs up its claims. Healthy students, studies suggest, have better grades and attendance, and students who feel personally connected to their school community reach higher levels of achievement. Likewise, those getting more physical activity during the day fare better academically (and socially and emotionally) than their less active peers.

These findings reveal the interconnectedness of school life, and the fact that health, fitness, emotions, and social issues work together to impact the school experience—and future directions in life.

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Unique to most lower and middle schools—and in line with ASCD's approach—is Duke School's own social and emotional curriculum. Known as Responsive Classroom in lower school and Developmental Designs in middle school, these curricula offer strategies to help students hone social and emotional skills throughout the school day. The result is a fully integrated program that is part of—rather than separate from—the academic curriculum. According to the Developmental Designs Web site, the goal is to “create inclusive classroom communities in which each member is engaged in learning and has a sense of belonging and safety.”

While Responsive Classroom has long been part of the lower school, the middle school started using its program last year. Nevertheless, a study undertaken in 2007 (before the launch of Developmental Designs), revealed that Duke School far outranks other schools in student feelings of belongingness and safety. Known as the Hope Study and developed by scholars at the University of Minnesota, the study assessed levels of hope felt by

students in close to twenty schools nationwide. As the study title suggests, the attribute of hope influences school experience, with more hope leading to more effort, better performance, and higher levels of engagement. Head of School Dave Michelman explains the results: “In all areas, our returning students were more engaged and committed to school than those in the other surveyed schools. This indicates that we are indeed molding well-rounded students by preparing them to work collaboratively, to feel comfortable with who and what they are, and to envision and go after a bright future.”

### **Integrated and Project-Based**

Math, science, language arts, and social studies—these subjects formed the bulk of the curricula of yesteryears, standing alone and rarely intersecting. Math teachers needn't know what happened in language arts, and vice versa. Now, things are changing, and just as the real world infiltrates the classroom, most school subjects cross paths and intertwine.

Known in the education world as an integrated curriculum—and long practiced at Duke School—this method of teaching and learning blurs boundaries between content areas and promotes 21<sup>st</sup>-century skills. The George Lucas Educational Foundation explains the connection:

In today's dynamic global economy, centered on the development and exchange of knowledge and information, individuals prosper who are fluent in several disciplines and comfortable moving among them. Creativity, adaptability, critical reasoning, and collaboration are highly valued skills. When it comes to fostering those skills in the classroom, integrated study is an extremely effective approach, helping students develop multifaceted expertise and grasp the important role interrelationships can play in the real world.

One of the best ways to integrate





studies across the curriculum, experts say, is through project work. Hardly new, this approach dates back, at least, to the 16<sup>th</sup> century, when Italian architects wanted to raise their trade to an art form and set out training students not only to construct buildings but also to understand the theory, history, and meaning of their profession. Training methods involved interdisciplinary projects that combined theory with hands-on experience. This concept, known today as the project-based approach, eventually spread to other fields and became an established teaching practice in the early 20<sup>th</sup> century, supported by education reformer John Dewey and others.

Though the project method has ebbed and flowed in popularity, the late 1980s kick-started the resurgence still in existence today, particularly the 1989 publication of Lilian Katz and Sylvia Chard's groundbreaking book, *Engaging Children's Minds: The Project Approach*. Slowly but steadily over the past 20 years, the idea caught on, first in

progressive education circles and today as a hallmark of 21<sup>st</sup>-century schools.

What makes project learning so ideal for present-day students is that it offers everything proponents of 21<sup>st</sup>-century learning say schools need: connections to the real world, opportunities to build on student interests and questions, hands-on experience, a chance to hone research and communication skills, and options for teachers to tailor instruction to individual needs. It also sets up opportunities to integrate technology into the classroom—and to use technology not as an end in itself (*I memorized how to set up a table in Microsoft Excel*) but as a tool for acquiring and generating information (*I used Excel to crunch data from my survey*). According to Anne Shaw, director of 21<sup>st</sup> Century Schools, an independent company providing professional development and resources for teachers, integrating technology in this fashion will “make our students truly media literate as they function in a ... collaborative, research-based

environment—researching, analyzing, synthesizing, critiquing, evaluating, and creating new knowledge.”

With the wellspring of enthusiasm for project-based learning, an increasing number of schools across the country now claim to use this approach. Advertisements pronounce *project learning* and *integrated coursework*, and school mission statements use these terms in spades. While the fervor for project learning is great, proponents say, they also warn that it takes time and support to learn, develop, and implement. “[Project-based learning] takes good teachers to make it work well,” says education reformer Bob Pearlman, who helps schools across the country start using the project approach. “It’s hard work designing effective projects, scaffolding activities, benchmarks, rubrics, and culminating products and events. And it’s a challenge to manage the [project-based] classroom and orchestrate all phases of the project.”

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The project-based approach is hard work, indeed, though less challenging after some 20 years in the making, Duke School teachers say. "This is not a new venture for us," Curriculum Director Bartelmay explains. "We continue to refine and improve our practice, but we've been in the project business for quite some time." In fact, project learning experts Katz and Chard visited Duke School three times, once to help teachers hone their approach and other times for public talks and more teacher training. The partnership with these scholars continues, with dozens of Duke School teachers attending Katz and Chard's four-day seminar in Illinois; with Duke School featured in their 2008 compilation of exemplary projects worldwide; and with Bartelmay selected as one of a handful of educators to promote the next generation of project-based learning worldwide.

"The new form of project learning isn't that different from what we've been doing," Bartelmay explains. "It

focuses on learning how to ask the right questions and then sort through the massive amount of information at kids' fingertips. Projects, which are open-ended, offer the kind of flexibility that pushes kids to evaluate, analyze, and make sense of it all."

#### **Good Citizens Unite— and Make a Difference**

The old citizenship grade on report cards shed light on a child's behavior in the classroom. Now, in concert with the aims to extend the classroom to the real world, schools foster good citizenship not just on school grounds but also in the community, whether at the local, state, national, or global level. "A sense of community and responsibility is [no longer] confined to the classroom," says education author Alfie Kohn. "Indeed, students are helped to locate themselves in widening circles of care that extend beyond self, beyond friends, beyond their own ethnic group, and beyond their own country."

The standard community service requirement, for which students volunteer once a year to help a local charity, is being retooled. The new form of community service takes the one-time altruistic experience to another level, transforming it into an ongoing, valuable learning experience that students seldom forget. Known as service learning, it is "a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities," explains the National Service-Learning Clearinghouse, an outgrowth of the Learn and Serve America grant program. The National Youth Leadership Council provides the classic example: "Picking up trash by a riverbank is *service*. Studying water samples under a microscope is *learning*. When students collect and analyze water samples, and the local pollution control agency uses the findings to clean up a river ... that is *service-learning*."



At most schools across the country, the old version of community service persists. But at schools like Duke School, attuned to growth and change, this newer, more meaningful form of service is taking root. Duke School, in fact, launched a service learning initiative last year, and already students are gaining insights, building skills, and giving back, working with organizations like the Inter-Faith Food Shuttle and the Triangle Land Conservancy—and planning to keep up the work for years. “It is my belief that service should become a habit,” says Head of School Dave Michelman, “and for something to become a habit, it must be done regularly.”

### Going Green

Any inhabitant of the 21<sup>st</sup> century knows about the environmental crisis at hand, and any school that can call itself a true 21<sup>st</sup>-century institution does what it can to make students aware of the problem. This all-important aspect of a 21<sup>st</sup>-century education—learning how to help save the planet—plays a central role in top schools, educators say. Though once linked to left-leaning parties and institutions, saving the environment now serves as a common goal among the country’s best schools, whether in the plains of Kansas, the delta of Mississippi, or the cities of New York. Says Anne Shaw of 21<sup>st</sup> Century Schools: “Our planet and its citizen residents are facing a growing number of issues related to the environment. Education is the key. From environmental awareness to producing scientists, politicians, international relations experts, media producers, and others, our schools will assist students in finding the answers to our environmental problems.”

At Duke School, a number of initiatives, long underway, enable students to lend a hand to the earth. Each year, every Duke School student spends months preparing for the school’s Earth Day celebration in April. Some perform plays on the stage beneath the old oak tree, while others make and exhibit posters about a

cause. In all cases, the devotion to the environment goes beyond a one-day celebration and is part of everyday life. Fourth graders, for instance, maintain the recycling program at the lower school, spending time each week sorting materials and ensuring that all classrooms follow the school’s rigorous recycling code; eighth graders do the same at the middle school. In addition, sixth graders spend three days each year at the Sound to Sea Environmental Education Program in the Outer Banks. Here, they learn about plant and animal life on a barrier island—and “how the loss of this amazing biodiversity is harmful to human health,” the program says. Similar learning goals take place in every classroom, with fourth graders visiting local rivers to explore ecological issues firsthand and seventh graders ascending on Brevard—a town known for its biodiversity—to work with species in their native habitats. Even as young as preschool, students learn to take care of and cherish mother earth. They investigate birds in and around the schoolyard, and they observe caterpillars and butterflies in gardens on school grounds.

To Head of School Michelman, this kind of work is serious, comprising not only a crucial part of a Duke School education but also representing a last great hope for the U.S. Referencing Pulitzer-Prize-winning author Thomas Friedman, Michelman points out that the U.S. once thrived on manufacturing and innovation, “but our future lies in our ability to develop green energy technology—and to do it quickly.” Michelman adds: “That’s why all of Duke School’s green initiatives are important. We need to help students become good stewards of the earth that they will inherit, and we need them to innovate and change the ways of previous generations.”

### The Space We Inhabit

If one word could characterize 21<sup>st</sup>-century schools, then *flexibility* might do the trick—teachers must maintain flexibility of mind, students must



remain open and flexible as they cross-navigate disciplines, and the actual school buildings, too, must function as flexible learning spaces that adapt to student needs. No longer set up with lined desks, classrooms of the new millennium, whether remodeled or built anew, come equipped with spaces that accommodate the many learning groups—small, large, or individual—that might form in a single day; they also offer ample wall space to display student work—and gathering and performance spaces for the school community. As internationally-acclaimed school architect Prakash Nair puts it, “the insular citadel that used to be school is quickly changing to a model where ‘school’ is not just a place but a doorway to a world of learning.”

Nair, co-founder of the architecture firm Fielding Nair International (FNI) that designed Duke School’s new state-of-the-art campus, has created some of the world’s most innovative education facilities—Goa International School in India, Sinarmas World School in

Indonesia, Kindergarten Development Center in Qatar, Millennium High School in New York City, and dozens more. Trailblazers in the school design field, he and partner Randy Fielding believe that the space in which students spend their days shapes learning outcomes and experiences. The architects don’t just configure a “one size fits all” model for every school. Instead, they get to know each learning facility individually and then come up with a custom-made design that capitalizes on the unique features of the school.

With Duke School, FNI knew right away that the design had to reflect the school’s student-centered approach to teaching and its integrated, project-based curriculum—all best practices in 21<sup>st</sup>-century education. Various learning studios accommodate direct instruction, while others allow students to try their hands at something and make a mess; central atriums convert easily into performance and presentation spaces, and pavilions and courtyards extend classrooms to

the outdoors. On their Web site, FNI refers to the Duke School project as a “10/10—a 10 in terms of educational philosophy and a 10 in terms of school design.” They add: “Duke School can now confidently claim that it not only practices 21<sup>st</sup>-century education, but that it does so in an environment designed specifically for the task.”

### The Full Package

The seeds of a 21<sup>st</sup>-century education, planted long ago at Duke School, differ radically from the position in which most schools find themselves in this era of change and uncertainty. As a national leader in the full package of a 21<sup>st</sup>-century education, Duke School serves as a role model in preparing future generations to actualize their full human potential, both individually and as members of society. The future looks bright—*really* bright—with this new cohort of students at the helm. ❖

