

Can a Selective Secondary School



**COLUMBIA SECONDARY SCHOOL
FOR MATH, SCIENCE & ENGINEERING**
a public school. community. and university partnership



by Gary M. Stern

By now, most people know the statistics about the scarcity of minorities, particularly Latinos and African-Americans, who establish careers in math, science and engineering. Only about 6.5 percent of all bachelor's degrees in engineering in 2008 were earned by Hispanics; and 4.7 percent, by African-Americans, according to the National Action Council for Minorities in Engineering (NACME).

Without encouraging Hispanics, the fastest-growing population in the U.S., to pursue careers in science, technology, engineering and math (STEM), the country might lose its competitive edge. Columbia Secondary School for Math, Science & Engineering, located on the top two floors of a Harlem elementary school in New York, is showing early signs of making a difference in developing minority students' skills in science and math. Can this school serve as a nationwide model?

Columbia Secondary School opened in fall 2007. It currently has about 300 students enrolled in sixth to eighth grade and is projected to peak at 700 students as it adds a year annually until it reaches 12th grade. Of its students, 50 percent are Hispanic; 21 percent, African-American; and 29

percent, White and Asian. Hence, this selective school is attracting the best and brightest students interested in an accelerated curriculum in Upper Manhattan.

The high school attracts a large minority population because of the predominantly Hispanic and African-American students enrolled in public schools in Upper Manhattan; it's not choosing students based on their race or ethnicity. However, since its student body is mostly minority, it is dedicated to encouraging diverse students to consider careers in math and science and showing them that these subjects can be fun and challenging.

Columbia Secondary is a specialized public school that operates as a partnership between New York City's Department of Education and Columbia University. It was conceived by Lee Bollinger, president of Columbia University, Mayor Bloomberg of New York, and Joel Klein, New York City Education Department chancellor. "The city wanted to promote private and public school partnerships," explained José Gabriel Maldonado-Rivera, principal, Columbia Secondary School.

The other highly selective high schools in New York City have a much lower percentage of minority students. By comparison, Bronx High School of Science has only 7.5 percent Hispanic students, 4 percent African-American students, and 88 percent White or Asian students, of its 2,785 students; Stuyvesant has only 3 percent Hispanic students, 2 percent African-American students, and 95 percent White or Asian students, of its 3,245 students; Brooklyn Tech has only 8 percent Latino students, 13 percent African-American students, and 79 percent White or Asian students, of its 4,590 students. Hence, Columbia Secondary is 71 percent minority while the others are 5 percent, 11 percent and 12 percent minority.

Since it is a partnership, who ultimately runs the school?

Maldonado-Rivera replied that the school is held accountable by the city Education Department and must adhere to union regulations like any other public school. Since it



percent, White and Asian.

To be accepted into Columbia Secondary School, students must live above 96th Street in Manhattan, take the New York City Department of Education's admission test, have a middle school average above 90 percent or higher, and score 4 (the highest rating) in the Education Department's English and math tests. There are about 10 applicants for every spot at the

is a selective school and receives special support from Columbia University, it has certain "latitudes" that enable it to operate differently than most traditional schools, such as its students taking field trips to Puerto Rico and Maine (more about that later).

Vice Provost Roxie Smith, a liaison between the university and Columbia Secondary, said Columbia wanted to get involved with the high

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school because there was no specialized school in northern Manhattan and insufficient space in others. Having triggered some negative publicity by hoping to expand in Harlem, Columbia likely wanted to give back to the community and generate some positive publicity.

The university is the school's "community partner," supporting it in a variety of ways, Smith suggested. Columbia Secondary's high school students can use the university's research libraries. Columbia University undergraduate students teach at Columbia Secondary, are mentors and hold internships there. When Columbia Secondary students become high school juniors, they can take certain university courses for credit. Moreover, Columbia Secondary teachers can take up to 15 credits of Teachers College graduate classes at no cost.

To launch the school and let parents know of its existence, Maldonado-Rivera did extensive outreach at many of the 64 elementary schools located in Upper Manhattan. "Just putting the school's name on a directory with 300 other schools won't bring in families. Having a face-to-face with the principal, shaking hands and hearing him speak in Spanish works better," he said.

Despite its math and science emphasis, Columbia Secondary is dedicated to a well-rounded education and stresses active learning. Every student is required to take seven years of philosophy. All courses are writing intensive. Its goal is to create an engaged, committed student who is active in the world and considers civics and politics, not just science and math.

Having students start in sixth grade differentiates Columbia Secondary from the other specialized schools. Students are immersed in advanced science classes once they start at the school. Even middle school students must take electives such as marine biology and biogenetics. "Our curriculum provides in-depth knowledge of math and science. Most curriculums are a mile wide and an inch deep," said Maldonado-Rivera.

Even its physical education curriculum is innovative. Rather than rely on traditional gym courses, it promises "real fitness" for students, understanding that the body and the mind, as Walt Whitman once noted, are interconnected. Its fitness curriculum includes yoga, hiking, soccer, swimming and street hockey.

While it may serve as a specialized school, most classes have the same faculty-student ratio as any other New York City public secondary class-



room. About two-thirds of its classes have 32 students, though elective classes will have 16 students.

Moreover, Columbia Secondary includes learning outside the classroom. When most classrooms are winding down in June, sixth-graders take a two-week ecological trip to Puerto Rico to visit a rain forest and swim in coral reefs, or seventh-graders travel to Maine to study its natural history and national parks. These excursions bring marine biology to life. "Our field trips integrate the three key elements of our teaching philosophy: living and learning communities, facing challenges and interdisciplinary thinking," Maldonado-Rivera said.

Financing these trips costs Columbia Secondary about \$150,000 in total or about \$500 a student. Trips were financed out of the school's budget, fundraising and by parents who could afford to pay something. Most students aren't charged for these trips. "The trips abroad and to Maine support the entire enrichment program," noted Maldonado-Rivera.

Clara Hemphill, author of *New York City's Best Public Middle Schools* and a senior editor at the Center for New York City Affairs at the New School, described Columbia Secondary's educational approach as "more progressive than Bronx High School of Science and Stuyvesant because Columbia Secondary relies more on projects and less on textbooks." Hence it stresses active learning by involving students in experiments and research rather than relying on traditional book learning. For example, on the first day of class, sixth-graders at Columbia Secondary build a chair out

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of cardboard, which reveals their engineering skills, while Brooklyn Tech students perform this same exercise in ninth grade.

“These schools can succeed if they get to students in sixth grade, not ninth. Overall middle schools in poorer neighborhoods are inadequate. Even bright kids who attend inadequate schools aren’t prepared to take specialized high school exams,” Hemphill said.

After two years, Columbia Secondary is showing signs of early success, though any results are incomplete since the school does not have its full roster of students. Columbia Secondary has been rated in the top 6 percent of all middle schools and top three of new middle schools.

Specialized secondary schools like Columbia Secondary have been criticized by some educators as skimming the most talented students and weakening the local high schools. In response, Maldonado-Rivera said, “Different schools serve the needs of different students.” Would these gifted and talented sixth-graders be better served in a local middle school where they would get lost? Students with special attributes and talent deserve an education that meets their needs, he suggested.

When Columbia Secondary first launched, the New York City Department of Education was planning to build a new school in the center of Harlem to accommodate its 700 full complement of students. However, New York City Education Department budget cuts have put that construction on hold. Since the elementary school where Columbia Secondary is housed has had a declining population, the goal is for Columbia Secondary’s students to be accommodated within its building. “The crunch will occur when we add our senior years, three or four years down the road,” Maldonado-Rivera acknowledged. Hemphill says construction of a

new building is one of the major issues the school faces in the future.

Maldonado-Rivera has the perfect background to serve as principal. He holds graduate degrees in ecology, biology and science from Columbia University and the University of California-Santa Barbara, teaches a graduate course at Teachers College, and was a former English chairman at Hartwick College. Hemphill described him as a “maverick” who can stand up for the school despite pressures from the New York City Department of Education.

In an interview with *The Village Voice*, Maldonado-Rivera said he wasn’t concerned if many of its graduates don’t eventually become scientists. What matters most, he said, is that “science gives them a qualitative perspective on the world. It’s fine if they become poets or cinematographers.” He noted that their knowledge of science will qualify them for jobs at large pharmaceutical or bioengineering companies. Since many are bilingual, they will be marketable.

Maldonado-Rivera sees Columbia Secondary as providing a “humanistic liberal arts and science education. We’re not trying to be Bronx High School of Science, which wants to be like MIT, but we’re more like an Oberlin or Reed College. We need lawyers as much as we need scientists.”

Smith said Columbia Secondary could serve as a role model for other public schools encouraging minority students to study math and science. It starts students in elementary school, which enables it to reach students at an early point. The school views the student “holistically. It’s just as important to them that students study art, music and philosophy as it is to have depth in math and science,” she said.

