Robert P. Moses taught middle school mathematics at Horace Mann School in New York City from 1958 to 1961. In the early 1960s, Moses was a key organizer for the Civil Rights movement as a field secretary for the Student Non-Violent Coordinating Committee. From 1969 to 1975, he worked for the Ministry of Education in Tanzania, Africa. As a MacArthur Fellow from 1982 to 1987, Moses taught 7th and 8th grade algebra full time as a school volunteer in the Open Program of the Martin Luther King Elementary School in Cambridge, Massachusetts.

When he was a civil rights worker in Mississippi, Moses came to understand the power of a united community. Once members of the African American community determined that they wanted, needed, and would have the right to vote, nothing could stop the momentum. Moses, who now heads the Algebra Project, believes that the same collective effort can transform the education experience for those children who have traditionally been held to the lowest expectations. One Man One Vote has now become Each One Teach One. And the prize is algebra.

Why is algebra the focus of your project?

There are two reasons. One is technology. Another reason is equity. Algebra is a gatekeeper subject. Too many poor children and children of color are denied access to upper-level math classes—to full citizenship, really—because they don’t know algebra.

How has technology created a need for students to gain a solid grounding in algebra?

I started thinking about this back in the 1950s when I was exploring the possibility of doing graduate work at Harvard. At that time, computer technology was still very new. Clearly, we didn’t know how that technology would change our lives. Then, in 1976, my wife and I returned to the United States after teaching math at a secondary school in Tanzania—and Apple released its desktop and personal computers. Suddenly, computers became a tool for the masses.

I started to wonder what this technology might mean for our schools and society. It became clear to me that there would be an enormous shift in how we use technology. Instead of using these tools to help us mechanize physical work, we would use them to help us organize mental thought. It also became clear to me that schools were by-products of the older technology and that we needed some radical changes to accommodate this new technology and new way of thinking.

Truly understanding this new technology requires a new literacy. Computers are run by symbolic systems. To understand the language of computers, we must have an understanding of the mathematics that encodes quantitative data and creates symbolic representations. The place in the curriculum where students are introduced to this language is algebra.

How is understanding algebra linked to citizenship?

People who don’t understand algebra today are like those people who couldn’t read or write in the industrial age. Computers have made elementary mathematics as important as reading and writing. Knowing algebra is the new floor, so to speak. To participate fully in a world driven by computer...
technology, to be able to get a job that supports a family, you have to be literate in math—and that requires that you have to be at least literate in algebra by the time you go to high school.

Also, understanding algebra is a powerful tool that we can use to a much greater end. It can give students access to higher-level math courses, which is important because many school systems still track poor children and children of color into lower-level math courses. What may be more important, though, is the self-confidence that students gain when they master algebra. Many of the students I've worked with in the Algebra Project simply weren't expected to learn this math—and they were somehow convinced that they couldn't learn it. In learning algebra, these students learn that they can learn.
The tracking issue was part of the reason that you started the Algebra Project. How does your work help even the odds for those students who are destined for lower-level math classes?

The Algebra Project stemmed from my work at the Martin Luther King School in Cambridge, Massachusetts. When my daughter, Maisha, entered 8th grade, I felt that she was ready to study algebra, but she didn't want to do "two maths"—my math and the school's math. So I suggested that I come in and teach Maisha my math in school. I talked with Maisha's teacher, who was very receptive to the idea. In fact, three other children were also interested in learning algebra. I was willing to teach it. My teaching was a natural fit.

At that time, Cambridge had a city-wide algebra test for 8th graders—anybody who took algebra was eligible to take this test. None of the kids in the Martin Luther King School had ever taken the test before. After a year of doing my math—algebra—Maisha and her friends took the test, passed it, and started geometry the next year. The school asked me to come back after that, and I did.

So, how did taking algebra even the odds? Well, for the first four students—and for those that followed—it meant that they had access to honors math courses in high school. It meant that they had a better chance of getting into college—and from there into math- and science-related careers.

We need to help kids understand that it's largely their work to master difficult mathematical concepts.

The Algebra Project has really grown. According to your Web site (www.algebra.org), the program is now implemented at 22 sites in 13 states across the United States. How did the Algebra Project develop over time?

I took on more students at the Martin Luther King School. Not too long after that first year, I worked with a group of black undergraduates at Harvard University to create a transition math curriculum for 6th graders. We expanded into a couple of schools in Boston, and gradually, we branched into different places around the country.
The technology shift that is transforming our society is also begging us to ask, “What kind of schools and schooling can best help kids take advantage of this new technology?”

We really haven’t marketed the Algebra Project—we have expanded into schools that contacted us and asked for our assistance. We haven’t developed a central staff that goes out and runs projects, and the main reason is that education has to respond to local conditions. To be successful, people in a given community must be dedicated to making changes.

What are some of the changes that need to be made? You have been teaching algebra for almost 20 years. Has your experience helped you identify some of the barriers minority students face when learning algebra?

The chief barriers are the deficits that children carry with them into the classroom. You can deal with those deficits if you can get the children’s attention. But to get the children’s attention, you must address a much larger issue that is national in scope—the “sharecropper education” that so many black Americans have received.

A sharecropper education is an education of lowest expectations. Because people do a certain kind of work, their education is directly tied to this kind of work; they learn no more than is necessary to complete the task. Unwittingly or worse, when the picking and chopping of cotton became mechanized, we sent 5 million or more black people into the urban areas of the country with a sharecropper education. This education of low expectations was then internalized in the community.

The response of the United States to this education discrepancy between blacks and whites was to rescue a handful of students from failing schools. We tried busing, we tried magnet schools, we tried charter schools, and now we’re trying to get vouchers. All of these are aimed at rescuing students rather than lobbying for policies that say, “Let’s rev up the quality of teaching. Let’s actually require elementary school teachers to meet higher standards. Let’s require elementary school teachers to know math so they can teach it.” We don’t ever get to ground zero and really fix the schools.

Recently, I saw a photograph on the front page of an Atlanta newspaper. In this photograph, some people were laughing, some were crying. Many were black people who were upset because their kids didn’t get into some prestigious middle school—there was a lottery drawing and only so many slots. This is the rescue policy, and it pits people against one another. They’re fighting for the few slots available in an elite school because they want to make sure that their kids won’t fall through the cracks. Instead, we should be fighting for real change and high expectations in all schools. And the time is right. The technology shift that is transforming our society is also begging us to ask, “What kind of schools and schooling can best help kids take advantage of this new technology?”

The kind of schooling you have pioneered in the Algebra Project is experiential in nature. You have become famous for your subway trips that help students grasp the concept of number, for example.

It’s important, first of all, to understand that the language of math is not a language that anyone speaks. It’s a formal language. When I was doing my graduate work in philosophy at Harvard, the star of the department, Willard Van Orman Quine, talked about

Each One Teach One

Young people in the Algebra Project have embraced the slogan “Each One Teach One.” Students who are part of the Algebra Project become math literacy workers to teach others what they have learned.

The Algebra Project began when Maisha Moses was in the 8th grade. Her father’s concern about her mathematics education brought him into the classroom to teach algebra—and he’s been there ever since.

Maisha is now a teacher trainer for the Algebra Project. She maintained contact with her elementary school throughout her years at Harvard and tutored children at the Martin Luther King School. When she graduated, she decided to work with the Algebra Project in Oakland, California. When the Algebra Project set up a program to train teachers as trainers, Maisha became deeply involved in that effort and apprenticed with a master trainer. She is now qualified to train teachers and to transfer those training skills to young people.
“the regimentation of ordinary language.” You take ordinary discourse, and you put a straitjacket on it, so to speak—this conceptual language underlies all of math and science.

We don’t speak this conceptual language, and our students certainly don’t. But we can learn it. The experiential learning model helps kids create a conceptual language by first grounding mathematics in the daily life and culture that they understand.

Instead of asking students to memorize equations and formulas, we take students on the subway and show them, step by step, how to transform their trip into a mathematical equation. In arithmetic, the underlying metaphor that kids have for addition is piling stuff on—you have five apples, add five more, and you get 10. The underlying metaphor for subtraction is taking away—you have five apples, take two away, and you have three left. These metaphors are insufficient for understanding algebra. If we want to create a new floor of math literacy, we have to ensure that kids have a new understanding.

In algebra, the direction you move on the number line is indicated by the number and not by the operation. The operation of subtraction in algebra is now assigned the job of representing the relative positions of two points on the number line. This is a concept that students must grasp if they are going to be able to take advanced mathematics. The subway rides help students grasp the concept of subtraction as relative position. The teacher teases out the key features of the event: What was the start station? What was the finish station? How many stops in one direction did you travel? What is the position of the finish relative to the start?

The students then create their own symbolic representation of the event. They have to describe and justify the formula to their peers. The subway rides help demystify the symbols and help students understand how symbols and formulas and rules are developed. Then, later, if kids get lost, they have this grounding to stand on. The teacher can say, “Well, remember when you went on the subway rides? Recall what you learned then.” This is the new floor, the basic understanding of mathematics that all children need to have.

The experiential approach honors how kids think. The hard work in developing curriculum is to think about kids’ minds when creating ways to approach math. I’ve been working with teachers for the past couple of weeks to prepare...
materials for 9th-grade algebra at Lanier High School in Jackson, Mississippi—the school where I now spend most of my teaching time. We’ve developed a curriculum that covers trinomials and their expansions and uses physical models. To do this, we had to think about the students’ experiences that would allow them to accept this way of thinking about multiplication.

One of the things that struck me in reading about the Algebra Project was its emphasis on helping students develop self-efficacy. You have written, for example, that most analyses of the civil rights movement miss a key point: that in addition to challenging the white power structure, the movement also demanded that black people challenge themselves. Is that a crucial aspect of the Algebra Project?

Yes. In my book, I write about a girl named Andrea who, at age 12, announced that she wanted to do four math lessons a week because she wanted to complete so much of a particular book by the end of the 7th grade. That way, she’d be able to finish the entire book by the end of the 8th grade and be ready for honors geometry in the 9th grade. These were Andrea’s goals—not the teacher’s. At first, of course, the other kids said, “Are you crazy?” But they started to think about what they could do, too. Andrea’s self-confidence and determination rubbed off on the other students.

One result of asking students to challenge themselves is best seen in the Young People’s Project. It took nearly 20 years for it to develop. The kids with whom I started, including my own children, were in middle school in the early 1980s. When they reached their mid- to late-20s, some of them came back to the Algebra Project and latched on to the concept of helping middle school and high school kids become math literacy workers. To be math literacy workers, the younger students had to learn a section of the math well enough to feel comfortable presenting it to their peers.

This was groundbreaking because there weren’t any models of young black kids standing up in front of other students and talking about math. These middle and high school students were a little uncertain about how they would be received by their peers. But it was considered “cool” because the young, 20-something kids from the Algebra Project were at the school, encouraging them. And, for the past three years, a group of high school students from Mississippi and Massachusetts have organized and run a math-focused day camp, training themselves to be math literacy workers.

This is part of what I call “working the demand side” of the problem: getting younger people to make a demand on themselves initially. Then, they have to make larger demands on the institutions they are a part of.

**In what ways do these experiences teach young people about the value of citizenship and the responsibility that they have to work together to make positive changes within their communities?**

The students learn that they can’t really make it alone. So, they have to figure out how to work together, help one another, and accomplish reform in a public space. These students learn that they need to have public organizations that they work hard to develop.

It’s not easy. The 20-year-olds had to bump up against themselves and their friends and their families and various institutions to develop this network. And the network is still fragile. The roots are there, but they’re easy to pull up.

The key is for young people to figure out how to organize themselves. We need to help kids understand that it’s largely their work to master difficult mathematical concepts. We need to help kids understand that it’s their job to learn how to give good presentations to their peers. You won’t get the math in unless we figure out how to create a culture that’s demanding the math. We need to create a demand for this kind of instruction in schools. And it’s not just math—it’s their whole education. How are these young people going to overthrow the legacy of a sharecropper education? How are they going to get society to agree to work with them to do this? And the young people have to do it because the central issues in this country have never been resolved just by advocacy.

The experiences that students have through programs like the Algebra Project help them see that it’s not only sufficient—it’s necessary—to change the balance of power. They see that this is their struggle; it wasn’t something that was just handed to them. These experiences will help these young people grow and multiply their networks. And, if this growth happens, then I have the sense that down the road—10 or 20 years from now—we’ll be able to look out and see something really different.

---

**Robert P. Moses** is coauthor, with Charles E. Cobb Jr., of *Radical Equations: Math Literacy and Civil Rights* (Beacon Press, 2001). For ordering information, call 888-817-113, ext. 123. Information about the Algebra Project is available online at www.algebra.org/index.html. **Kathy Checkley** is a writer/editor at ASCD; kcheckley@ascd.org.