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THE ALGEBRA PROJECT

*Math Literacy is the Key to 21st Century Citizenship!*

# Five-Step Process: Step Three

by Bill Crombie, Aidan Soguero

The Algebra Project's Five-Step Curricular Process has been at the center of our classroom and Professional Development pedagogy since the Project's inception. Exploiting a more traditional work cycle, the five steps are meant to be taken in order, as well as repeated.

*Students from the June Jordan School of Equity//Marcus Hung*

For the third step in the Algebra Project's Five-Step Curricular Process, "People Talk" gives students the opportunity to verbalize their findings from the previous two steps, "A Shared Physical Experience" and "A Picture/Model". They use their ordinary, everyday language as a testing ground for their ability to communicate ideas effectively among a crowd of their peers.

The third step utilizes small groups discussions, and aims to accomplish two things: empower students, and affect dialogue. A beneficial outgrowth is that it will also generate the data necessary for interpretation in the final two steps, "Feature Talk" and "Symbolic Representation".

"Before we get to the actual work of equations or abstract mathematics, we need the voice of the students to have an opportunity to come out" says Alan Shaw, Associate Professor of Computer Science at Kennesaw State University. "And to come out in a way that is natural, that comes from their own experiences. Their own feeling of, 'well this is what it meant to me.'"

People Talk gives each student the opportunity to voice their own thoughts. By fashioning into small groups, students have time to comfortably form their opinions and dissect their observations before verbally discussing them. In a more traditional lecture style classroom, too often the only students who speak are those who are confident in their answers or questions being the 'correct ones'. By facilitating *(Cont'd on page 6)*

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## Celebrating Shirley Kimbrough's Life

We at the Algebra Project were saddened by the news that longtime ally, mother, wife, and organizer Shirley Kimbrough passed away on January 28, 2023.

Shirley Kimbrough had the heart of an educator, community organizer, parent, caregiver, mentor and activist. Shirley's heart was huge; and anyone who had the chance to meet her felt the warmth and purpose it exuded. So, in the early 1980s when her path crossed with Algebra Project founder, Bob Moses, before there was an Algebra Project, something amazingly important transpired. Shirley's presence and interactions with Bob and fellow parents helped to catalyze AP from an array of exceptional concepts, to a set of catalyzing expectations.

Shirley was committed to educational equity and justice outside her professional career. Along with other members of "The Village", including her late husband Les Kimbrough, she was an active member of the King Open School community. She was a founding parent board member of The Algebra Project, helping support the implementation and teaching of algebra at the King Open School and beyond in the 1980s and 1990s. She remained a steadfast supporter of AP and the Young People's Project, our sister organization, her entire life. Throughout the 21st century, she and her husband continued to support our work financially.

She had raised the question to parents about who should start studying algebra in grade 7 and thus elevated issues of equity and access and led to a commitment to have all students 'at the table.'

- Khari Milner, Chair, Board of Directors, The Algebra Project

*Below is an excerpt from Maisha Moses' words at Shirley Kimbrough's memorial service:*

Shirley was there for the beginning of the Algebra Project. My dad talked about this a lot. After the first year or two of his teaching math at the King Open school he wrote in his book, Radical Equations, "parents noticed that the attitude of their children toward math was changing. Something seemed to be different to the Milners, the Kimbroughs, the Jameses and others. I was primarily talking to parents like Liberty individually. Our children were in and out of each other's homes. We were not an organization, but organized effort began to evolve out of our conversations. One result was that in 1984-85 a group of parents decided that decisions about studying algebra in the 7th and 8th grades would not rest solely with administrators and teachers. And during the spring of 1984, one of the parents, Shirley Kimbrough, sent out a letter to every parent with a child about to begin the 7th grade.

*Shirley Kimbrough*

And here's Shirley, in her own words: We had been meeting and discussing the academic challenges minority students face for some time. Generally, they were not doing as well as nonminority kids in math and science. Why? What should we expect of our children? A lot of parents had not taken algebra in middle school. And then there is attitude. I remember having this conversation with one parent - a white parent who taught at another school - "I don't feel all children should take algebra," she told me. I said, "Let's find out from the parents themselves."

Shirley's letter asked two key questions: Do you think your child should do algebra? Do you think every child should do algebra?

It was these two questions that launched the Algebra Project, because of course every parent said yes to the first question, and because of that Algebra was offered to all 7th and 8th graders at the King Open, even though they didn't all say yes to the second question.

There are deep lessons in Shirley's questions and they are as relevant today as they were in 1984.

- Maisha Moses, Executive Director, The Young People's Project

# Remarks on the Struggle for Citizenship and Math/Science Literacy

Robert P. Moses, The Algebra Project, Inc.

(Originally published in the Journal of Mathematical Behavior, Vol. 13, pp. 107-111, November, 1994, with new foreword by Ben Moynihan)

*In 1994, 12 years after founding the Algebra Project in Cambridge, MA, Bob Moses concluded his first year of teaching at Brinkley Middle School in Jackson, Mississippi. Bob's experience working closely with students and teachers in classrooms was key to his determination that the minimal acceptable outcome for all students graduating middle school needed to be preparedness for a college preparatory math sequence in high school. As Bob explains in his article, the organizing mode central to the Mississippi theater of the 1960s Civil Rights Movement formed the bedrock for establishing the Algebra Project's paradigm for encouraging all students to hit a target with a gait as rapid and varied as "math literacy": the ability to read, write and reason with the symbol systems of mathematics, in order to access full participation in today's society.*

*In the nearly three decades since this article's original publication, the Algebra Project has both grown and evolved in many ways, while remaining connected to our roots. We now work with both middle schools and high schools, and an array of sister organizations have carried the project's Five-Step Curricular Process into elementary schools, after school, summer and community based settings, and collaborate in growing the emerging national We the People – Math Literacy for All Alliance. At the Algebra Project, Inc., we continue operating on the ground in school communities, with a small team of staff, consultants, researchers and activists, relying heavily on the emergence of community leadership, our work continues to center students, teachers and school leaders addressing the problem of the lack of access to math literacy. We continue to emphasize a school-based, university-affiliated approach to research to insure that improvements to curriculum pedagogy, assessment, and assistive technologies are vetted in and informed by everyday teaching and learning situations. We seek to explore and innovate interventions – aligned with the experiences and expertises of local and national collaborators – that can achieve the maximum effect in support of all students.*

*Just as Bob outlined 29 years ago, we would be remiss not to reaffirm at least one thing: the organizing strategies leveraged so effectively in the 1960s by the members of SNCC, CORE, NAACP, SCLC and COFO in Mississippi has staying power in our collective push towards math literacy for all young people today.*

- Ben Moynihan, Interim Executive Director

What is needed in school mathematics? The context that's most important for me in considering this question is that there's an enormous social problem to be addressed. In the background of this problem is history: a history of the struggle for freedom, which requires literacy. Theresa Perry points out that there's also a history of using literacy as a tool for freedom (Perry & Fraser 1993).

This history is part of the answer to the question "what will motivate students and their parents to get involved in learning math and science?" People sometimes ask "Why should students want to do the math? What is the hook which will get the community aroused over this issue?"

One of the central things we're saying is that the ongoing struggle for citizenship and equality for minority people is now linked to an issue of math and science literacy. This idea is the background of everything we do in the Algebra Project. This idea determines strategies and choices made about organization, dissemination, and the content of the curriculum. It never goes away. It's important to make it clear that even the development of some sterling new curriculum-a real breakthrough-would not make us happy if it did not deeply and seriously address the issue of access to literacy for everyone. That is what is driving the project.

One of the implications of this position has been that we have not spent a major portion of our time developing a full curriculum for any grade level. What we did was take what we thought was a minimum intervention and try to maximize its effects. In that process we began to define what we're calling a "floor" - an acceptable goal or standard for the mathematical component of math-science literacy at the middle school level. The "floor" is this: you have all the middle school students ready to do the college prep math sequence when they get to

high school.

There are two things to clarify about this floor. First, it's the floor, not the ceiling. We're not trying to put constraints or limits on what any group of children might learn. Second, in many ways the college prep math curriculum is a moving target. It differs from place to place, and it's changing. So for each school, there's a local target. My metaphor is that you're running to get on board the bus. The bus is moving, and you can't get on it from a standstill position. As your speed begins to approach the speed of the bus, you have a chance of hopping on.

In terms of curriculum, this means that for each middle school student there is a standard curriculum out there, which is the college prep sequence in high school. What you want for an Algebra Project student is this: whatever is out there, they engage it. In their school system, whatever is in place as the standard college prep curriculum, you want them to engage that. It's important, however, that whatever else is coming in to supplement or replace that curriculum has to be a bona fide college preparation. It can't be something that is put in place to continue a tradition of separate tracks for some students.

It's not clear that the expression "standard college prep math curriculum" means something coherent in terms of mathematical content. However, it certainly does mean something in terms of what colleges are going to accept as admissions requirements. It's got to mean, at a minimum, that when you finish it you arrive at college ready to do college mathematics. That's another floor that we have to be concerned about, although our work is largely with middle schools. Our aim is to change the situation that currently exists, where large percentages of minority students who get through a high school and get admitted to a college, have to take remedial math in order to get to the place where they can even get college credit for mathematics courses.

Recently I heard from a woman who teaches mathematics at the University of Arkansas at Monticello. She told me that about 80% of freshman must take remedial math, for which they cannot get college credit. Another person, head of a center for academic advising for minority students at University of Kentucky at Louisville, told me that close to 90% of entering minority students had to take remedial algebra during their freshman year, for which they did not get credit. A faculty member at Rutgers in experimental physics recently lamented the absence of minority students in his classes. He said "they're all across campus in the remedial sections."

Part of the literacy standard, then, the floor for all students, must be this: in middle school, when you leave, you are ready to engage with the college preparatory sequence in high school. It's a moving target, but however it's defined, it must then be seen as another floor: you must be ready to engage college curricula in math and science, for full college credit.

This overall picture requires that we think longitudinally, and that we track what happens after students leave our immediate domain of interest or expertise. This kind of longitudinal thinking is difficult to do, because it requires coordinating actions and decisions among a wide variety of institutions and people.

Consider the role of mathematicians here. There is nothing in the training of mathematicians that prepares them to lead in such a literacy effort. Yet the literacy effort really cannot succeed unless it enlists the active participation of some critical mass of the mathematical community. The question of how we all learn to work across several arenas is unsolved. Those arenas are large and complicated. They include the curriculum itself, instructional philosophy, schools, school systems, and individual classrooms. Communities and their processes of social change must also be centrally involved, and in some broad sense, national and local politics. Really working in all these arenas will require that many people adopt a more holistic outlook than they have ever done before.

The civil rights movement is the experience that guides my thinking here. In the theater that I was in, Mississippi, the issue was citizenship. Within the citizenship issue was embedded the literacy issue. This was symbolized and instantiated by the fact that the state required prospective voters to make some interpretation of the Constitution. Underneath this practice was a question: should we give the vote to illiterate people? Thus another question was raised: what is the literacy that is needed to exercise the right to vote?

What we came to see was that we had to launch a campaign which was broad enough to reach through to where the power was, the power that was *(read the rest on algebra.org)*

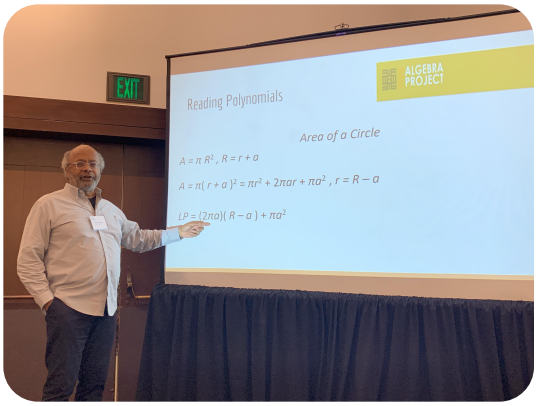
**Courtland Cox Joins the Algebra Project Board of Directors:** On December 16th, 2022, Courtland Cox was formally voted in as a Board member. Courtland began his long career as a civil rights organizer in 1960 when he joined the Nonviolent Action Group (NAG), which eventually became the Student Nonviolent Coordinating Committee (SNCC). Several years later, he became SNCC's Program Coordinator, and today he remains involved as the chair of the SNCC Legacy Project. He holds a degree in business and is currently president of CCAP Consulting.

*Courtland Cox*

On his motivations for joining the AP Board of Directors, he stated: "The Algebra Project is in a transitionary period. With a long history of research, philosophy, and curriculum as its solid foundation, I am excited to help expand its impact and broaden our reach."

**Bill Crombie Joins the Learning Forward Advisory Group:** Algebra Project Director of Professional Development, Bill Crombie, has joined the Learning Forward Curriculum-Based Professional Learning Network Advisory Team. Per their website, Learning Forward is, "a nonprofit membership association focused solely on ensuring success for all students through effective professional learning and school improvement. It advocates for every educator having access to professional learning that is results-driven, standard-based, and job-embedded." He represents the Algebra Project among the network of seasoned Professional Developers.

**Algebra Project Research Presented on at Joint Mathematics Meeting:** At the session held on January 6th, 2023, Bill Crombie presented The Quadratic Glass Ceiling and its Consequences. The presentation outlined a few examples from Algebra I, Geometry and Algebra II which demonstrated the accessibility of topics previously considered "too advanced" for underserved students, which suggest that an appropriate floor for math literacy in the 21st century needs to be reconsidered to account for the gap between what could be taught and what is taught in secondary mathematics.




*Bill Crombie Presenting at JMM*

**AMS Published a Tribute Article in Bob Moses' Honor:** The American Mathematical Society published, in their February Black History Month edition, a memorial tribute article in Bob Moses' honor. The article contains stories from 26 collaborators surrounding Bob's history and the personal impact he left on the lives of so many.

*(cont'd from page 1)* dialogue and discussion between peers, rather than a question and answer formula between student and teacher, there is no conception of being wrong.

Alan, who wrote a paper about the importance of orality in the classroom alongside Algebra Project Director of Professional Development, Bill Crombie et al., explains the importance of the low-stress small group discussions, "If you get a chance to really talk and really get your ideas on the table, there's a chance that that's gonna start making you see that what you think is important."

*Alan Shaw*

The method isn't limited in its effectiveness to mathematics. In fact, its fruition didn't stem from mathematics education in the first place. It came from the Civil Rights Movement.

In the 1960s, Black sharecroppers and day-laborers were systemically prohibited from receiving an education that gave them a high degree of literacy. Simultaneously and very much intentionally, a high degree of literacy was made a requirement in order to vote.

"Sharecroppers in Mississippi, they go from being people who know they're going through some kind of oppression and they're being treated unfairly, but they don't see themselves as having the power to overturn that. They don't see their voice as something that could make a difference. And so, how do you change that?" Alan explains how Bob Moses developed the third step during his 1960s organizing activity in the South, under the mentorship of Ella Baker, "Bob would call it an earned insurgency. So, what he would do is have small group discussions. Everybody knew that these issues existed in the South, but when you had these small groups, you could talk within that group. A smaller community could talk and uncover a way of presenting the ideas, becoming articulate about how to explain what your ideas are."

The clarity that came from sharecroppers expressing ideas they may never have vocalized before, and the social empowerment of their peer's response was a watershed moment that played one role in the 1964 Mississippi voter registration drive known as Freedom Summer.

Today, in the classroom, focusing so heavily on student voice similarly serves as an investment when, in later steps such as Feature Talk and Symbolic Representation, students have the social empowerment necessary to talk about the more abstract aspects of algebra. They have the ability and desire to voice concerns and questions, and to assist in explaining anything their peers might be struggling with.

But it isn't just about confidence making. While the emotional empowerment is an important dimension here, so, too, is the data that they are generating and framing through their verbal observations. That observational data collectively generated provides a foundation for the abstract symbolic representations to come later – it's a key component of sense making for interpreting the symbol system of mathematics.

Besides obtaining the clearance necessary for one to stand on the power of their own voice and ideas, it also opens another door. It teaches students the importance of dialogue.

Each student should now not only feel assured in their own thought process, but comfortable negotiating feedback and fielding questions as well. This allows that thought process, and the conclusions therein, to constantly evolve.

"The feedback you're getting is helping you go deeper. You don't wanna just stay where you are. You don't wanna just assume that what your initial reaction was is where you're gonna end up. So you go deeper. But you gotta get there from first getting engaged." Alan says.

By verbalizing ideas among their group, students see real-time reactions to their own thoughts. They might be met with agreement, or confusion, or boredom, and this, in turn, leads to a deeper understanding of how to express their thoughts.

Eventually, armed with the confidence of having already articulated themselves, and revised and experimented with their ideas among their cohort, People Talk moves into its next phase which is large group discussion.

“You go from that smaller format to the large group where you have these breakout discussions and you are now kind of seasoned. You have a way of talking to the bigger group that you developed in the smaller group.” Alan tells me.

It's not an academically exclusive conversation. And that is key in teachers allowing students to claim ownership of these mathematical concepts. Which is why the third step in the process has deep roots in the paradigm that Ella Baker established around community organizing; or trusting that leadership will emerge from local people.

Ella Baker, a behind-the-scenes mentor to activists coming through the Student Nonviolent Coordinating Committee (SNCC) where she was a lead strategist, was concerned with how you get ordinary discourse on the table. When sharecroppers came into the meeting, if they saw experts up there with degrees and suits, they were very hesitant to talk.

The problem that SNCC had was how to get the sharecroppers to talk about their deepest concerns. And the strategy they took was first to do it in small groups and then to have those small groups take it to the general meeting, which is why Bob rarely led a discussion. Bob just helped organize them.

*Students from the June Jordan School of Equity//Marcus Hung*

Teachers utilizing the Five-Step Curricular Process, likewise, will find themselves taking a step back, especially in these early stages, and letting students take the lead. It is not the job of the teacher to lead the student to a correct answer, but to facilitate discussion and allow the group to deduce their own explanation and come to a shared understanding with the class.

Taking the time, in these early stages, to foster that kind of learning environment is, largely, what separates the Algebra Project from many math education initiatives. Every learning initiative is primarily concerned with outcomes. For the Algebra Project, that outcome is a student prepared to do college level mathematics. But the third step in the Five-Step Process brings to the forefront an education that focuses on the whole child, rather than one small aspect, such as their proclivity for rote memorization and algorithmic computation.

An Algebra Project classroom is not just about pedagogy and content. The traditional “educational trinity” consists of curriculum, assessment and instruction. With the Five-Step Curricular Process, it is expanded into a quartet: curriculum, assessment, instruction, and culture. The culture of the classroom is all about the relationships. Ideally, rich relationships that teachers build and facilitate with the students in the classroom, but also the relationship that students have amongst themselves.

This necessarily involves, for example, whether kids feel safe enough in the classroom to talk about the ideas that they have.

Alan reflects on a scenario all too familiar to teachers, “By the time they're in 12th grade, you ask a question and nobody raises their hand. Everybody's afraid to speak, they don't wanna be wrong. They don't want somebody to tell them that something they said or thought wasn't valid. And so teachers, early on, gotta work against that. And People Talk is one clear approach on how to work against that.”

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**& many more!**

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