Practices Worthy of Attention

Professional Learning Communities

Columbus Public Schools

Columbus, Ohio

Summary of Practice. Columbus Public Schools has created professional learning communities, in which teacher leaders and secondary mathematics teachers work together to improve implementation and to standardize their improved practice by focusing on student work and test scores and providing a safe place for teachers to learn and grow. Teachers appear to enjoy this collegial atmosphere and—from enrollment figures and test scores—it appears that these changes are indeed related to improvement in student learning, as demonstrated in higher graduation rates and higher test scores across all subgroups.

Need. Columbus identified a need to standardize the way mathematics teachers used resources and engaged students in the classroom. Columbus believes that common practice in mathematics teaching helps provide equitable learning opportunities for all students across the district.

Goal. The goal of Columbus's professional learning communities was to develop a way for mathematics teachers to continually interact with and learn from one another while standardizing and improving their practice, leading to higher student learning and achievement.

Demographics

Columbus Public Schools (Columbus, Ohio) serves grades K–12. Enrollment has dropped over the past few years, from more than 62,000 students to fewer than 58,000 (see Table 1).

Table 1. Columbus Public Schools Enrollment Data

Academic Year	Enrollment
2002–2003	62,880
2003–2004	61,927
2004–2005	59,754
2005–2006	57,827

Table 2 shows the percentage of students enrolled, graduating, and dropping out since 2002–2003 by race/ethnicity, limited English proficiency, and economic disadvantage. The majority of students in Columbus are black (62.5%), followed by white (29.2%), Hispanic (4.7%), and Asian American (about 2%). About 7% of Columbus students are classified as having limited proficiency in English, and about 74% are classified as economically disadvantaged.

Columbus's superintendent had set a goal of a 65% graduation rate by summer 2006, and the district exceeded that goal, with a record high graduation rate of 79.2% for 2005–2006. The superintendent intends for Columbus to reach a 90% graduation rate by 2012. Dropout rates are 2% to 4% in all disaggregated categories.

Table 2. Columbus Public Schools Enrollment, Graduation, and Dropout Rates

Demographics	Academic Year	Percentage of Enrollment	Percentage Graduating	Percentage Dropping Out
All Students	2002–2003	100	59.9	3.3
	2003–2004	100	60.6	2.4
	2004–2005	100	67.7	2.4
	2005–2006	100	79.2	3.7
Asian American	2002–2003	2.2	71.7	2.0
	2003–2004	2.2	63.9	*
	2004–2005	2.2	77.2	0.9
	2005–2006	2.0	*	1.8
Black	2002–2003	61.9	63.1	3.4
	2003–2004	62.5	63.1	2.5
	2004–2005	62.6	70.7	2.4
	2005–2006	62.5	*	3.8
Hispanic	2002–2003	2.8	64.4	0.8
	2003–2004	3.5	52.8	0.5
	2004–2005	4.1	69.2	0.6
	2005–2006	4.7	*	2.0
White	2002–2003	32.8	54.0	3.5
	2003–2004	31.6	56.1	2.6
	2004–2005	30.4	63.3	2.3
	2005–2006	29.2	*	3.7
Limited English Proficient	2002–2003	6.2	*	*
	2003–2004	7.4	*	*
	2004–2005	8.0	*	*
	2005–2006	7.2	*	*
Economically Disadvantaged	2002–2003	65.4	*	1.8
	2003–2004	72.9	*	2.3
	2004–2005	70.9	*	2.2
	2005–2006	73.9	*	3.7

Note: The asterisk (*) notes that data were not available.

Description of the Practice

In fall 2000, Columbus Public Schools began building a common vision and practice for supporting all students so they could be academically successful. District leaders believed that a common vision and practice in mathematics instruction would provide equitable learning opportunities for all students, so they worked to develop a way for mathematics teachers to continually interact with and learn from one another while standardizing and improving their practice. One way the district has built and sustained the common vision and practice has

been to involve all K–12 teachers in professional learning communities. However, since the focus of *Practices Worthy of Attention* is secondary mathematics, this case study discusses only Columbus's work on mathematics in secondary schools.

Preparing the Way for Successful Professional Learning Communities

To make sure their professional learning communities (PLCs) have guidance and support, Columbus trains "teacher leaders" at each school. Teachers who are nominated by their principals to become teacher leaders attend a two-day summer Teacher Leader Academy. District administrators conduct the Teacher Leader Academy, explaining the district's philosophy about using PLCs and discussing the components the district has identified as crucial for effective PLC interaction. These components include a collaborative focus on student learning and the development of a district culture that supports effective collaboration. For example, the district encourages teachers to visit one another's classrooms often to share ideas and give each other feedback. To make sure teacher leaders can engage in and conduct effective collaboration, the district helps them learn how to develop communication norms and goals.

At the Teacher Leader Academy, the district administrators and teacher leaders form their own professional learning community that operates throughout the school year, as teacher leaders meet monthly to discuss strategies and techniques for leading PLCs at their schools. After the summer training, the teacher leaders go back to their schools and form professional learning communities with their colleagues there. The two-day Teacher Leader Academy training lets teacher leaders know what to expect from the PLCs they will lead and participate in.

Columbus has used PLCs in several ways, including to support teachers as they implement the district's revised standards-based mathematics curriculum. Columbus revised their mathematics curriculum guides in December 2005 to increase their compliance with the state standards. The guides cover K–11 mathematics and provide teachers with materials and specific lesson examples for each topic area within the state standards. Columbus had their mathematics curriculum guides reviewed by Phi Delta Kappan International's Curriculum Management Center, which gave them high ratings. By seeking authoritative external validation of their mathematics curriculum development, the district assured teachers that their tools and resources were of high quality, while also finding a way to standardize the expectations of what teachers should be teaching in their classrooms.

Professional Learning Communities in Action

In their own schools, teacher leaders conduct regular meetings to help their colleagues work as a team to address issues. Most of the time in these meetings is spent developing specific strategies for addressing their students' needs, but their work involves reviewing progress on school-specific action plans, student testing results, and teacher–student survey results. The teacher leaders also monitor the implementation of the district mathematics curriculum and instructional techniques and talk about ways to implement more systematic use of the district's standards-based mathematics curriculum guides. In addition, teacher leaders are

released for several half-days to coach individual teachers, introducing and encouraging improvements in instructional practices.

All mathematics teachers meet weekly and have a common class period, called a study group session, in which they discuss major issues with which they are struggling (e.g., understanding what to do with assessment data). These meetings are led by teacher leaders, and in their conversations, the teachers come to a common understanding of what good mathematics instruction looks like.

Increasing comfort with collaboration on issues has encouraged teachers to stop working in isolation and to open their classrooms and their practices to observation. Teacher leaders have developed and refined a data-collection tool they use in observing classrooms and collecting information about instructional strategies. The teacher leaders use the observations to promote discussions with teachers on how to learn from these observation experiences; the culture surrounding these discussions is not evaluative, but collaborative. The teacher leaders hope that these discussions can help shape professional development to meet the needs of teachers, focusing on specific ways to improve instructional practices.

Principals also observe classrooms to see if there is systematic use of the standards-based mathematics curriculum guides. Most principals do classroom walkthroughs daily, as required by the district. The principals have been trained to ask reflective questions of teachers and have also learned how to focus on what they should be seeing in mathematics classrooms: active student engagement, with the appropriate use of manipulatives and technology.

District-level administrators also visit classrooms, and several mathematics curriculum specialists spend at least a half-day per week visiting buildings and monitoring the implementation of the mathematics curriculum. Classrooms are now very open, and secondary mathematics teachers are becoming more accustomed to regular visitors in their classes.

Results

Columbus's use of professional learning communities shows promise for improving teachers' pedagogy and students' mathematical learning, whether the district focuses on teacher change or student change. To see the effects of professional learning communities on teachers, an outside evaluator surveyed Columbus teachers and discovered that they found the curriculum guides very useful. This evaluation also surveyed district executive directors to whom principals report. The executive directors mentioned that the curriculum guides have been especially helpful to principals, as the guides provide more consistent expectations within and across schools and guidance with respect to the timing of when specific content is taught. Because the curriculum guide was respected by both teachers and district leaders, it was used consistently, and the consistent use of these common materials provided a common platform from which teachers could talk about curriculum and instruction in their PLCs.

As the state standards have changed over time, the district's professional development has increasingly focused on the alignment of lessons with the standards and the use of inquiry-based instruction. Surveys of district teachers indicate that they strongly support the use of

PLCs and that information is being collected and shared to improve the culture of teaching in Columbus. Teachers also find the shared study group sessions useful for establishing collaboration and consistency of instruction. They find that talking together helps them develop a better understanding of what they need to do to improve student learning.

Columbus uses several indicators to measure change in student learning, which include high school graduation rates, student performance on the mathematics portion of the required state exam, and enrollment of students in higher-level high school mathematics courses. Table 3 lists the results, broken down by ethnicity, limited English proficiency, and economic disadvantage, for grades 6–8 on the mathematics section of the Ohio Achievement Test (OAT) and for grade 10 on the mathematics section of the Ohio Graduation Test (OGT).

The grade 6 OAT has been administered since the initial implementation of the No Child Left Behind Act, and Table 3 lists the OAT mathematics scores since the 2002–2003 academic year. The OATs for grades 7 and 8 were first administered in 2004–2005, and the grade 10 OGT was first administered in 2003–2004.

Only about 41% of all students are passing the OAT mathematics section in grades 6–8, while there has been an increase in the percentage of all students passing the OGT mathematics section (from 43% in 2003–2004 to 72% in 2005–2006). This increase in passing rates for the OGT mathematics section is true across all ethnicities, as well as for students with limited English proficiency or economic disadvantage. Scores for most student groups on the mathematics section of the OAT in grades 7 and 8 show improvement in the second year of testing (2005–2006).

On the mathematics section of the OAT for grades 7–8, the number of proficient students increased by 10 percentile points from 2004–2005 to 2005–2006; however, students with limited English proficiency remained about the same for these two years. The difference in performance of all students and students with limited English proficiency in 2005–2006 was 16 percentile points for grade 7 and 19 percentile points for grade 8, which is double the difference of the previous year. The performance gap between all students and students with limited English proficiency also widened on the mathematics section of the OGT. Economically disadvantaged students have closed the performance gap with all students on the grade 6 OAT, but fewer economically disadvantaged students are passing compared to all students in grades 7, 8, and 10.

Table 3. Columbus Public Schools Mathematics Ohio Achievement/Graduation Test Results

Demographics	Academic Year	Percentage At and Above the Proficient Level			
		Grade 6	Grade 7	Grade 8	Grade 10
All Students	2002–2003	32.6	*	*	*
	2003–2004	44.1	*	*	43.2
	2004–2005	41.7	31.8	33.0	67.5
	2005–2006	40.4	40.7	43.2	72.3
Asian American	2002–2003	58.1	*	*	*
	2003–2004	71.6	*	*	55.7
	2004–2005	68.6	60.9	62.7	77.6
	2005–2006	65.2	68.4	61.8	83.6
Black	2002–2003	25.8	*	*	*
	2003–2004	35.8	*	*	34.7
	2004–2005	34.9	24.5	25.9	61.4
	2005–2006	35.4	34.0	36.9	67.5
Hispanic	2002–2003	39.1	*	*	*
	2003–2004	50.4	*	*	38.3
	2004–2005	43.5	28.1	35.4	72.1
	2005–2006	37.9	34.1	38.6	74.1
White	2002–2003	44.5	*	*	*
	2003–2004	59.1	*	*	59.6
	2004–2005	54.6	46.5	47.7	80.6
	2005–2006	50.4	55.5	56.0	83.1
Limited English Proficient	2002–2003	25.4	*	*	*
	2003–2004	43.3	*	*	17.2
	2004–2005	39.3	23.7	24.8	50.3
	2005–2006	25.1	24.4	24.3	51.4
Economically Disadvantaged	2002–2003	25.1	*	*	*
	2003–2004	38.3	*	*	27.9
	2004–2005	36.2	25.9	27.1	62.4
	2005–2006	40.2	35.9	37.4	68.1

Note: The asterisk (*) notes that tests were not given in these years.

A telling sign of improvement in student mathematics learning includes an increase in the enrollment of black students (who constitute about 63% of all Columbus students) in advanced mathematics courses (Algebra II and above). Enrollment of black students continues to grow across all mathematics courses. From 2001–2002 to 2004–2005, enrollment of black students increased by 29% in middle school algebra, by 364% in middle school geometry, by 17% in Algebra II, by 29% in Precalculus, and by 16% in AP Calculus (see Table 4).

Table 4. Enrollment of Black Students in Advanced Mathematics Courses

Academic Year	Middle School Algebra	Middle School Geometry	Algebra II	Precalculus	AP Calculus
2001–2002	453	11	1304	255	70
2002–2003	476	13	1453	340	70
2003–2004	497	22	1154	253	72
2004–2005	586	51	1527	330	81

Similarly, more economically disadvantaged students (who make up about 70% of Columbia students) are taking higher-level mathematics courses. From 2001–2002 to 2004–2005, enrollment of economically disadvantaged students increased by 55% in middle school algebra, by 775% in middle school geometry, by 68% in Algebra II, by 84% in Precalculus, and by 72% in AP Calculus (see Table 5).

Table 5. Enrollment of Economically Disadvantaged Students in Advanced Mathematics Courses

Academic Year	Middle School Algebra	Middle School Geometry	Algebra II	Precalculus	AP Calculus
2001–2002	388	4	639	129	36
2002–2003	461	7	828	204	41
2003–2004	342	6	528	95	19
2004–2005	601	35	1072	237	62

Conclusions

Columbus Public Schools has been working for five years to provide a consistent set of pedagogical and content standards for its teachers and to find ways of implementing and monitoring the necessary changes, including achieving teacher buy-in through the use of professional learning communities. In the professional learning communities, teacher leaders and secondary mathematics teachers work together to improve implementation efforts and to standardize their improved practice by focusing on student work and student learning as measured by Ohio state exam scores. Teacher leaders help develop a safe culture in the professional learning communities so that teachers can learn and grow. Teachers appear to enjoy this collegial atmosphere and are learning to refine their practice. The increase in enrollment figures of previously underperforming student groups in higher-level mathematics courses is evidence of Columbus's focus on improving mathematics learning and achievement for students on the lower end of the achievement gap. In addition, student learning, as demonstrated in higher graduation rates and higher mathematics test scores across all subgroups, shows promise that the professional learning communities are improving teachers' practice in teaching mathematics and addressing students' mathematics needs.

About *Practices Worthy of Attention: Local Innovations in Strengthening Secondary Mathematics*

Practices Worthy of Attention is a joint initiative of Achieve, Inc. (www.achieve.org), and the Charles A. Dana Center at The University of Texas at Austin (www.utdanacenter.org). The initiative is led by Pamela L. Paek, a research associate at the Dana Center, who, in 2006, examined 22 program, school, and district practices that showed promise—based on early evidence and observation—of strengthening secondary mathematics teaching and learning.

Our goal was to document practitioners' descriptions of *what is really happening* in the field to strengthen secondary mathematics education around the country. Thus, while the practice highlighted may be common, the specific structures and strategies used to implement the practice are worthy of attention. These initial investigations set out to mark these practices for future rigorous scientific inquiry by Dana Center and other researchers.

Ultimately, we hope to create a community of inquiry made up of university researchers working with administrators and teachers from featured schools and districts to more rigorously research how effectively these practices improve secondary mathematics learning for all students.

Reports and practice profiles. An executive summary details the methods for this initiative and analyzes themes. Two cross-case analyses discuss specific strategies for raising student achievement and building teacher capacity. Brief profiles describe each practice. All of these publications are available on our website at www.utdanacenter.org.

Data. In all cases, data about the practice were provided by the program, school, or district studied as part of a description of their practice. We did not independently analyze data gathered through a consistent assessment tool, and we did not evaluate their uses of data for measuring effectiveness. Thus, the data in the practice profiles are intended not to prove the practice's effectiveness from a research perspective, but to paint a detailed picture of the practice and what data were used by the program, school, or district to gauge how well it was working.

Theoretical frameworks. In some cases, district staff mentioned specific literature on theory or practice that they used when they developed the practice we highlight. In those cases, we cite that literature in our discussion of the practice.

How to cite this profile

Paek, P. L. (2008, January). Professional learning communities: Columbus Public Schools. Case study from *Practices worthy of attention: Local innovations in strengthening secondary mathematics*. Austin, TX: Charles A. Dana Center at The University of Texas at Austin.