

Practices Worthy of Attention
English Language Learners Mathematics Initiative
New York City Department of Education
New York City, New York

Summary of the Practice. New York City is working to raise the mathematics achievement of English language learners through a network of mathematics and ELL leaders and through a professional development program, Quality Teaching for English Learners (QTEL). QTEL helps teachers and teacher educators become better equipped to educate secondary mathematics students who are learning English as a second language.

Need. Given New York City’s high proportion of English language learners, the city’s Department of Education recognized a need to help mathematics teachers develop the capacity to deal with the needs of these students.

Goal. The goal of New York City’s focus on English language learners in mathematics is to provide teachers with strategies for more effectively teaching mathematics to ELL students and to develop a districtwide network that is focused on issues in mathematics education for ELL students.

Demographics

The New York City Department of Education serves about 1,050,000 prekindergarten through grade 12 students. It is the largest school district in the U.S. Enrollment in the New York City Department of Education has been relatively stable since 2002–2003 (see Table 1).

Table 1. New York City Department of Education Enrollment Data

Academic Year	Enrollment
2002–2003	1,061,222
2003–2004	1,066,226
2004–2005	1,042,088
2005–2006	1,055,986

Table 2 shows student enrollment, graduation, and dropout rates since 2001–2002 by race/ethnicity, limited English proficiency, and economic disadvantage. In 2004–2005, the majority of students (about 86%) were racial or ethnic minorities, and the largest subgroups were Hispanic students (36.7%) and black students (34.7%). During that same year, almost 12.5% of students were classified as having limited proficiency in English, and 51.2% were classified as economically disadvantaged.

Graduation rates have increased for all students and most racial/ethnic subgroups, except for white students and Asian American students, who, despite relatively stable percentages, still

have the highest graduation rates. Dropout rates are highest for Hispanic students (20.6%) and black students (17.7%). Although the dropout rates for economically disadvantaged students and students with limited English proficiency are high, there is only one year of reported data for each category, making it difficult to establish any discernible data trend.

Table 2. New York City Department of Education Enrollment, Graduation, and Dropout Rates

Demographics	Academic Year	Percentage Enrolled	Percentage Graduating	Percentage Dropping Out
All Students	2001–2002	100	51.0	20.4
	2002–2003	100	50.8	20.3
	2003–2004	100	53.4	20.3
	2004–2005	100	54.3	16.3
Asian American	2001–2002	12.5	68.7	11.3
	2002–2003	14.1	66.9	12.2
	2003–2004	13.9	68.6	11.6
	2004–2005	14.3	66.9	9.5
Black	2001–2002	33.9	44.3	22.6
	2002–2003	35.1	44.4	22.1
	2003–2004	31.2	47.4	22.1
	2004–2005	34.7	48.8	17.7
Hispanic	2001–2002	38.1	41.3	25.9
	2002–2003	34.7	41.1	26.0
	2003–2004	40.1	43.4	25.8
	2004–2005	36.7	46.0	20.6
White	2001–2002	15.5	71.6	11.9
	2002–2003	16.1	70.5	12.2
	2003–2004	14.8	72.5	13.2
	2004–2005	14.2	71.9	10.6
Limited English Proficient / English Language Learners	2001–2002	13.9	*	*
	2002–2003	13.3	*	*
	2003–2004	13.1	*	*
	2004–2005	12.5	35.3	24.8
Economically Disadvantaged	2001–2002	51.3	31.3	31.7
	2002–2003	53.8	*	*
	2003–2004	50.8	*	*
	2004–2005	51.2	*	*

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

Description of the Practice

New York City Department of Education created the English Language Learners (ELL) Mathematics Initiative in 2004–2005 to raise the academic achievement of ELL students through a strong network of district and school-based mathematics and ELL leaders. This network comes together at professional development events, conferences, and action planning meetings. The ELL Mathematics Initiative, now in its third year, is currently composed of more than 250 mathematics and ELL leaders in the district. The initiative’s goals are to raise the quality of mathematics instruction systemwide while providing for the diverse needs of students with various language and academic backgrounds, and to cultivate a community of ELL and mathematics leaders.

At the core of the initiative is a focus on professional development for mathematics and ELL teachers. The target areas include scaffolds for entry, engagement, and extension in mathematics and academic language; enrichment of curriculum; native language mathematics instructional materials; teacher fluency in mathematics, math pedagogy, and discourse in English and other languages (for bilingual teachers); and understanding of student work. Since NYC believes that mathematics is not “language-neutral”—meaning that math pedagogy depends on the language of instruction—the professional development opportunities focus on how teachers must teach in ways that incorporate students’ native language, English, and academic mathematics language. Professional development is primarily offered in two ways. The first is through a Learning Network Conference the ELL Mathematics Initiative provides twice per year. The second is through teacher engagement in ongoing discussions and refinement of their practices throughout the year.

At the twice-yearly Learning Network Conference, teachers attend presentations to learn about new techniques that appear to be successful and participate in workshops that provide frameworks for making mathematics more meaningful to ELL students. Some of the presentations focus on issues of accountability for Adequate Yearly Progress, the use of specific curricula with ELL students, or hands-on activities to help students visualize concepts. Workshops at the Learning Network Conference can cover the same span of topics, including examining mathematics representation and discourse, revising strategies for helping ELL students understand Algebra concepts, and looking at research on English language development and mathematics achievement. Other presentations and workshops build on WestEd’s Quality Teaching for English Learners (QTEL) program, which NYC implemented in the summer of 2005. In short, this conference shares information on the education of ELL students in mathematics and is beginning to forge a new area of professional development and learning.

The QTEL program plays a large part in NYC’s plan to improve academic achievement of the city’s English language learners in secondary schools. WestEd introduced the Quality Teaching for English Learners (QTEL) program in 2001. The program was created to build teacher capacity for teaching ELL students in different content areas. WestEd claims that QTEL is specifically designed to “deepen the linguistic, conceptual, and academic development of adolescent English language learners” (WestEd, 2007). The tools and processes are taught in professional development modules, focusing on developing adolescent students’ abilities to read, write, and discuss academic texts in English.

QTEL includes summer institutes for mathematics teachers that build on one another, with a different focus each year. The city is phasing teachers into the program; some took the year 1 institute in the summer of 2005, so at the time this study was conducted, those teachers were completing the year 2 institute. Other teachers began the year 1 institute in summer 2006.

QTEL's year 1 summer institute is called Building the Base and is a five-day session that serves as the foundation of the entire QTEL program. During this institute, teachers develop an understanding of how scaffolding creates contexts for linguistic and academic learning specific to ELL students. Teachers are provided a theoretical foundation and corresponding strategies for effectively teaching academic language to ELL students. Teachers learn about six types of scaffolding—modeling, bridging, schema building, contextualization, text representation, and metacognitive development—and learn how to apply these scaffolding techniques in analysis of classroom exemplars. In year 2, the institute deepens teachers' understanding of mathematics, extending strategies from year 1.

In the QTEL five-day workshop, teachers receive training in analyzing and understanding students' needs in both mathematics and ELL instruction. For instance, reflection activities for teachers provide them opportunities to think about past lessons and plan how to address specific challenges. Teachers also analyze case studies or videos showing a range of teaching styles in order to better understand some obstacles to their own as well as their students' understanding. Additionally, teachers are asked to develop resources and lesson plans and to problem-solve specific teaching and learning situations.

Results

The only information on the results of the ELL Mathematics Initiative focuses on QTEL. An external evaluation of QTEL implementation in New York was conducted to evaluate the effectiveness of QTEL training on teachers. The results were presented in spring 2006, so it appears that the evaluation was after one year of implementation. The majority of responses about the professional development training were positive, with teachers indicating their intention to use the strategies in their classes. However, follow-up interviews and/or observations revealed that the level of implementation varied dramatically.

The evaluation categorized teachers' implementation into three levels. The majority of teachers were classified as mid-level; that is, they focused on using the QTEL techniques as taught in their training but did not yet know the techniques well enough to modify or adapt them. Those classified as high-level teachers were those with a strong understanding of teaching and learning who demonstrated creative and efficient adaptation of QTEL strategies. The teachers classified as low-level struggled with grasping QTEL tasks and techniques, and thus could not use the strategies in their classrooms.

Teachers' attitudes appeared to positively shift after QTEL training, as they began to believe their students were capable of doing more. When asked about the effects of QTEL on students, teachers claimed that their students were more engaged in class. They said that the students were collaborating more and using more English when talking, and in general teachers believed they saw a shift in the culture of the classroom, where ELL students appeared more comfortable participating in class activities. While teachers were pleased with

the program, many teachers felt they could have more fully implemented the strategies if there were more teacher collaboration time and coaching to help them learn to use the strategies more effectively.

Very little test score data was available, as the New York City Department of Education has changed their website and locating previous years' test scores is no longer feasible. (As of February 21, 2007, many of the links to past years of data were broken.) Also, data on secondary or graduation assessments were not available. Table 3 lists the results for two years on the combined City Mathematics Test and New York State Mathematics Test for grades 3–8; test scores were not reported by grade level. The exam performance of all students and all subgroups showed improvement from 2003–2004 to 2004–2005. A larger percentage of Asian American students met or exceeded the standard, followed closely by white students. The performance of students with limited English proficiency rose but still trailed all students by about 26 percentage points in 2004–2005. Economically disadvantaged students were performing better than students with limited English proficiency and were only about 8 percentage points behind all students in 2004–2005.

Table 3. New York City Department of Education Student Results on the Combined City Mathematics Test and New York State Mathematics Test for Grades 3–8

Demographics	Academic Year	Enrollment	Percentage Met / Exceeded Standard
All Students	2003–2004	570,306	46.7
	2004–2005	557,909	52.9
Asian American	2003–2004	79,273	71.8
	2004–2005	79,780	79.1
Black	2003–2004	177,935	31.6
	2004–2005	193,416	38.9
Hispanic	2003–2004	223,515	34.9
	2004–2005	204,564	42.3
White	2003–2004	84,405	65.8
	2004–2005	79,150	73.0
Limited English Proficient	2003–2004	73,018	20.6
	2004–2005	69,674	26.6
Economically Disadvantaged	2003–2004	289,716	36.5
	2004–2005	285,387	45.2

Table 4 shows the percentage of students meeting or exceeding the state standards on the mathematics section of the New York state exam from 2002 to 2006 by students classified as English language learners or not English language learners. Both groups are steadily increasing the percentage of students meeting or exceeding the standards. It appears that this increase is larger for students classified as English language learners, given that the percentage of those students meeting or exceeding the standards has more than tripled since

2002. Although the performance gap is still large between the two groups of students, the gap appears to be shrinking steadily each year.

Table 4. New York City Department of Education Results on the New York State Mathematics Test

Year	Percentage At and Above the Proficient Level	
	English Language Learners	Non-English Language Learners
2002	11.3	40.1
2003	16.8	44.9
2004	23.6	49.6
2005	30.8	56.1
2006	35.8	60.4

Conclusions

The ELL mathematics initiative in NYC is in its early stages, since it is just over two years old, and only one cohort of teachers had completed two QTEL summer institutes when this report was written. Teachers appear receptive to thinking about improving their practice to accommodate ELL students, given the widespread attendance at the network conferences and professional development opportunities. It is the department's hope is that teachers will become better at implementing effective teaching techniques to improve ELL student learning. Research to evaluate the effectiveness of QTEL on teachers' practices and student learning is being conducted in New York City, with an experimental study that involves random assignment of schools to treatment (QTEL) and control groups (no QTEL). The results will help answer questions about how QTEL changes teachers' pedagogy, their attitudes toward English language learners, and the alignment of their practices and different instructional strategies to match those taught in the QTEL workshops. This work may also indicate how teachers' use of QTEL improves ELL students' academic achievement.

References

WestEd. (2007). Quality Teaching for English Learners: Research base. Retrieved December 13, 2007, from <http://www.wested.org/cs/tqip/print/docs/qt/research.htm>.

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). English Language Learners Mathematics Initiative: New York City Department of Education. 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.