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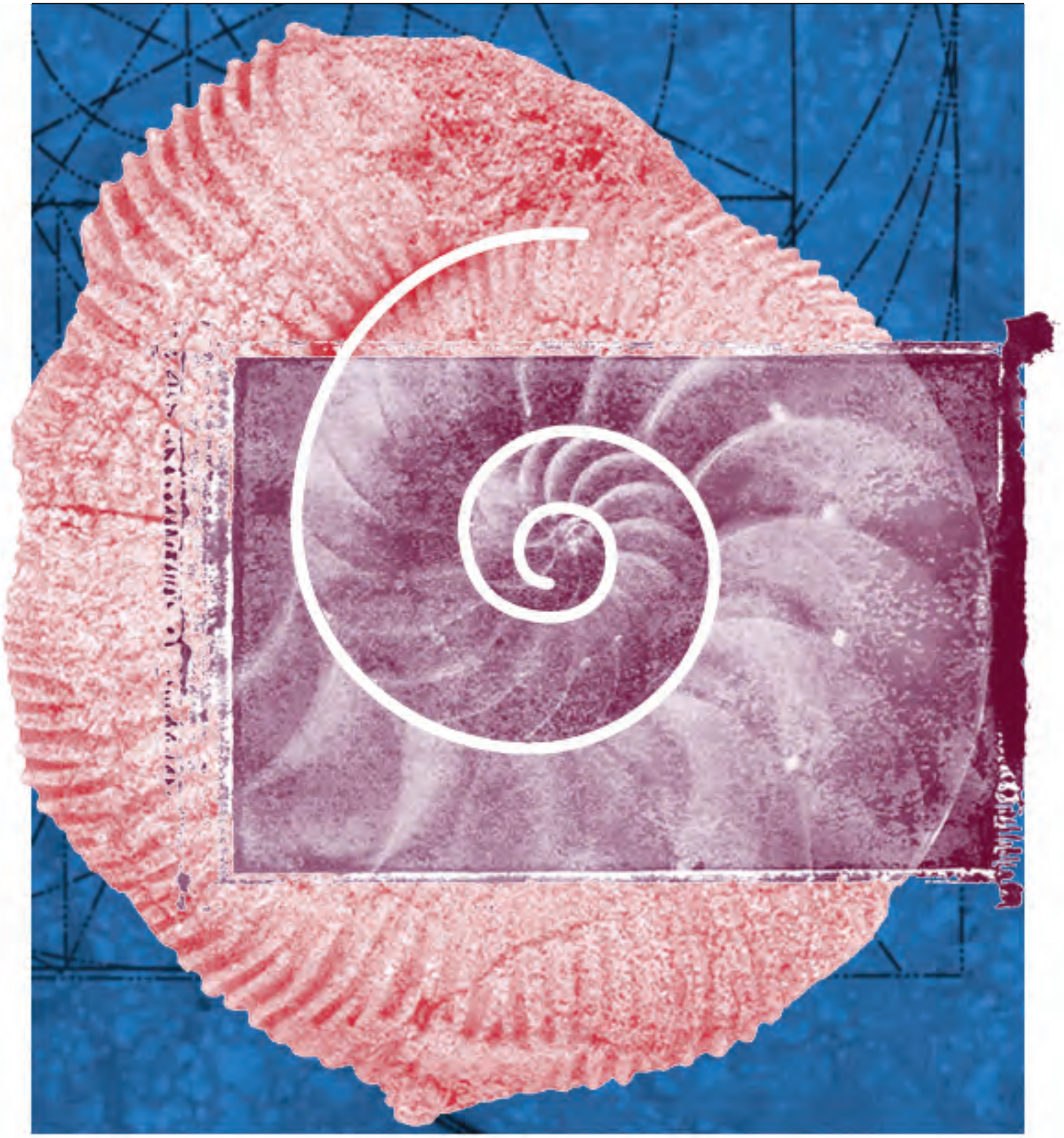

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Closing the Gap through an Explicit Focus on Learning and Teaching

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. . . When they teach you, they teach you with so much enthusiasm it makes you want to learn more than they're teaching you. You might get upset that you're leaving [the school] and it might feel early because the teachers are getting so enthusiastic with you and they're getting to a point that they're feeling like family. They're really like going for the gold and it's like their sole purpose is to teach you and to make you have fun.

This student at The Young Women's Leadership School (TYWLS) in East Harlem was describing the dedication and enthusiasm of her teachers. In 2001-02, TYWLS was one of only a handful of public, single-sex schools in the country. Like other highly effective, public schools that took part in a research study described here, the teachers at TYWLS made learning and teaching among their top priorities.

The Young Women's Leadership School was one of nine public, secondary-level schools selected in the spring of 2002 to participate in the High Achieving Schools (HAS) Initiative[1] for demonstrating exemplary achievement, while serving low-income communities. The nine schools from across the United States were chosen from more than 230 applicants specifically because they demonstrated: (1) free or reduced lunch rate of 50% or higher, and (2) sustained exemplary achievement or a significant increase in academic achievement, particularly in mathematics, over a minimum of 3-5 consecutive years. In addition to The Young Women's Leadership School, the following public, secondary-level schools (middle schools and high schools) were selected to participate in the project: Emerald Middle School, J.D. O'Bryant School of Mathematics and Science, KIPP Academy Houston, KIPP Academy New York, Latta High School, Rockcastle County Middle School, YES College Preparatory School, and Ysleta Middle School.

As part of the HAS Initiative, the nine schools participated in a research study conducted by the University of New Mexico (UNM) during the 2002-2003 academic year. One goal of the research undertaken was to learn what characteristics distinguished TYWLS and the eight other highly effective schools, particularly in mathematics. In this article, a summary of the principal findings will be shared and, on occasion, illuminated with examples.

Schooling in Low-Income Communities in the United States

Schools that serve low-income communities (defined here as schools in which 50% or more of the student population qualifies for free or reduced price lunch) have unique sets of problems that distinguish them from their more affluent, suburban counterparts. For example, at schools that serve low-income communities, students often attend classes in dilapidated facilities, have higher percentages of novice teachers, teachers without a teaching credential, and teachers who are teaching subjects in which they have neither a major nor a minor (Ingersoll, 1999; NRC, 2001). Schools that serve low-income communities are also characterized for their highly bureaucratic organizational structures (Kaestle, 1973); lack of support for change, particularly to

[1] Funding from the Hewlett-Packard Company supported the High Achieving Schools Initiative.

personalize and individualize education (Louis & Miles, 1990); and standardized and uncoordinated instructional programs that encourage a custodial attitude towards children (Winfield & Manning, 1992).

Research has also shown that schools that serve low-income communities struggle to implement and benefit from school reform efforts (Jackson and Davis, 2000; Olsen, 1998). Teachers at schools that serve low-income communities face challenges specific to implementing mathematics education reforms such as those promoted by the National Council of Teachers of Mathematics (1989; 2000) and the National Science Foundation (1996). For instance, they often have minimal access to professional development opportunities to learn about standards-based curriculum and instruction, and may face resistance to the implementation of mathematics education reforms by administrators, colleagues, parents, students, and others (Kitchen, 2003). The research on effective teaching and school restructuring provides insight into classroom-level strategies that can be implemented to overcome these challenges.

Effective Teaching and School Restructuring

The effective teaching literature (Brophy & Good, 1986; for mathematics see Good, Grouws, & Ebmeir, 1983) has consistently found that students taught by mathematics teachers who structure the lesson, maintain a decent pacing, and focus on the development of its main points outperform students whose teachers do not engage in a similar set of practices. Martin et al's (2000) analyses of TIMMS data found that opportunities provided at home (such as access to reading materials) to students were the most common school characteristics that discriminated schools whose students achieved high from those scoring low on the TIMSS mathematics and science assessment. Though not as important, the nature of mathematics and science instruction that was provided to students also made a difference.

In work on school restructuring and its relationship to student performance on high-level tasks, Newmann and Associates (1996) and Newmann & Wehlage (1995) reported that students enrolled in classes where the curriculum content and the instruction focused on depth (over mere coverage), analytic reasoning (over mere memorization), and the construction of value (over doing tasks as ends in themselves) out-performed their colleagues whose classrooms lacked these instructional features. Lee and Smith (2001) obtained similar results in their study of secondary schools. Secondary schools where mathematics and science course offerings were predominantly academic, where teachers as a whole tended to report instruction that focused on depth, analytic (or higher order) thinking, and value were schools whose students began to close the social-class-based achievement gap.

In line with these findings, an hypothesis of the HAS study was that at the nine highly effective schools that served low-income communities, the majority of mathematics teachers had developed strategies to overcome challenges alluded to previously to support instruction that matched these characteristics (depth, analytic reasoning, and value). The full report can be found at **www.unm.edu/~jbrink/HASchools**. Here we summarize our methodology and findings.

Research Methodology

Classroom Observations. During the 2002-2003 academic year, a team of UNM researchers visited all nine participating schools twice — once in the fall and once in the spring. During the fall of 2002 and the spring of 2003, we observed four teachers at each participating school. The participating teachers were selected by a school administrator to participate in the study. We requested that the four teachers be representative of the teachers at the school who taught the "regular" mathematics classes across multiple grade-levels. Overall, a total of eight observations were made at each participating school in the fall of 2002 and in the spring of 2003. School level and classroom level data were collected at the participating schools through classroom observations, interviews with teachers, administrators, and students, and through survey instruments.

Data collection and analysis. Qualitative methods were used to identify major patterns and themes related to the salient features that distinguished the participating schools as highly effective in mathematics, and to the teachers' conceptions and practices about mathematics curriculum, instruction, and assessment (Miles & Huberman, 1984; Strauss & Corbin, 1990). All qualitative data were analyzed by an iterative coding process (Emerson, Fretz, & Shaw, 1995). Codes were generated during the initial review of the interview texts. Relationships among the codes were explored in subsequent readings of responses and broad themes emerged. This process continued until consistent themes were achieved. The themes reported had to be confirmed by two or more teachers at more than 50% of the participating schools (i.e., two or more teachers from five or more schools).

Relevant Findings

Distinguishing Characteristics of the Highly Effective Schools

The analysis of teacher and student narratives revealed seven primary findings: (1) Learning and teaching are prioritized to support high academic expectations for student learning; (2) Supplemental support is provided for student learning; (3) Mathematics faculty has a strong and well-defined sense of purpose; (4) Mathematics faculty collaborate and support each other; (5) Teachers prepare their students to be successful on standardized tests, but teach "beyond the test;" (6) Teaching resources are available; and (7) Teachers have regular access to professional development opportunities.

Table 1

THE SEVEN DISTINGUISHING CHARACTERISTICS OF THE NINE HIGHLY EFFECTIVE SCHOOLS

1. Learning and teaching are prioritized to support high academic expectations for student learning.
2. Supplemental support is provided for student learning.
3. Mathematics faculty has a strong and well-defined sense of purpose.
4. Mathematics faculty collaborate and support each other.
5. Teachers prepare their students to be successful on standardized tests, but teach "beyond the test."
6. Teaching resources are available.
7. Teachers have regular access to professional development opportunities.

At all the participating middle schools, the discipline policy, class schedule, student support services, and professional development goals for teachers were established with one goal in mind: to positively impact student learning and achievement. Teachers valued problem solving and challenged students to think and reason. There was also an emphasis on instruction of mathematical facts and drill-and-practice approaches to teaching were used. However, because the primary goal was to challenge students with cognitively demanding mathematical content (e.g., students were expected to successfully complete a full year of Algebra I by the end of eighth grade), remediation was viewed as a means to that end. Teachers prioritized developing students' problem solving skills and taught challenging mathematical content with the goal of impacting their students' abilities to think critically. These findings lend strong support to the notion that highly effective schools implement curriculum and instruction aligned with standards-based recommendations (see NCTM 1989, 2000; NSF 1996).

All the schools had discipline policies that reinforced the notion that learning was the top priority and obstructing the learning of others was a serious offense. For instance, at Ysleta Middle School in El Paso, the behavioral expectations were identical in all classrooms and teachers collaborated to uniformly uphold and enforce these expectations. At YES College Preparatory School in Houston and the two KIPP Academies, students attended summer school where they were introduced to the schools' high behavioral expectations. A teacher at Emerald Middle School in El Cajon, California discussed how interdisciplinary teams at Emerald supported a focus on teaching rather than a focus on students with behavioral issues:

> *. . . I don't care how great of a teacher you are, if you don't have good management skills the kids aren't going to get it. You can have the best person, the person who knows everything about mathematics come into the classroom. Most likely they won't succeed because they don't know how to relate to the kids. So, the fact that I have a team, that I work with people… it allows me more freedom to teach the math, to work in the math area, so I'm not always dealing with behaviors. Behaviors, people help me with that so I'm able to focus on my actual subject area.*

Slogans at the participating schools such as "Failure is Not an Option" and "Whatever it Takes" that communicated high academic expectations were not merely hollow rhetoric. Extensive academic support services for students were widely available to sustain these high academic expectations. All the participating schools had after-school tutorial programs (teachers were paid a stipend to tutor at some schools), Saturday study sessions, tutorial programs provided through university partnerships, and procedures to regularly assess student progress. At a few of the schools, students could even call their teachers at home for assistance. At KIPP Academy New York, students could be pulled out of the one elective that was available, school orchestra, if they needed tutoring in any of the core subjects.

In addition to supplemental academic assistance, teachers had extended class periods to teach mathematics at participating middle schools. Teachers took advantage of this extra time to meet students' remediation needs and challenge them with cognitively demanding mathematical content. This two-pronged approach, instruction focused

on both remediation and challenging students with cognitively demanding mathematics curriculum, was possible because teachers had the time to do both. A teacher at YES College Preparatory School explained the benefits of having additional instructional time with students:

> *I think one of the reasons that happened, if you think of the kids that we're serving, a lot of them, they come in 6th grade and they don't come in with the skills in order to take pre-algebra. They get double the time in math… Getting the kids in middle school with an hour and a half, it allows you to go over homework; it allows you to do a mini-lesson in between maybe even your lesson. It allows you the opportunity to give the class a chance to understand, give them class work. So having a double period is really awesome. I don't know if we could potentially teach as much as we do in a 45-minute block. I think that would be a disservice to them.*

Teachers across the highly effective schools spoke about how they worked with their colleagues to horizontally and vertically align curriculum, shared teaching ideas, discussed their students' mathematical strengths and weaknesses, and wrote and/or modified curriculum together. At the charter schools, time was built into the daily schedule for the mathematics teachers to meet. At Rockcastle County Middle School in Kentucky, teachers credited their extensive and long-term collaborations as key to the school's dramatic academic turnaround over the course of the past decade. The strong collaborations that existed among teachers clearly supported the implementation of challenging mathematics curriculum and instruction.

There is little doubt that the extraordinary collaborations that existed among faculty were among the primary reasons why the participating schools were highly effective. Teacher meetings often revolved around standardized testing. For instance, teachers engaged in test item analysis to identify students' weaknesses and wrote instructional units to prepare students for the test. Nonetheless, though teachers worked to help their students be successful on standardized tests, the test did not necessarily dictate mathematics curricula and instruction. Teachers spoke about teaching beyond the test. A teacher at KIPP Academy New York said: ". . . if you're teaching correctly, everything applies to the test. A test is just a basic problem solving situation, so if you're teaching them problem solving you won't have to worry so much about teaching [to] the test." The focus on high expectations for student learning at participating schools coupled with the support mechanisms for students to thrive academically led to high achievement. This finding is an important one for schools given the high-stakes testing climate that currently exists in the United States.

Teachers talked about how fortunate they were to have so many teaching resources. They also spoke about how when they needed something, they could simply open their closets and pull out the desired materials. The resources were available to support the primary goals at the schools, learning and teaching. In general, teachers did not feel they had to beg for materials to be effective at their jobs. A teacher at Rockcastle County Middle School discussed how there were so many materials available at Rockcastle that it was actually a bit overwhelming: "… I think I have so many materials that it's hard to find what's what; it's almost too much. I guess it's a great thing, because we have so many materials to pull from that it's almost overwhelming." In addition, Rockcastle County Middle School and Ysleta Middle School employed a full-time mathematics consultant whose job was to support mathematics instruction at the school.

Final Remarks

The focus on learning and teaching, support provided for student learning, and the availability of both professional development opportunities and teaching resources for the teachers promoted rigorous, enduring, and genuine learning environments at the nine highly effective schools that served low-income communities. Teachers came to school to teach and students came to learn. The culture at these schools was the exact opposite of what one may find at less effective schools: students who interrupted the learning of others were reprimanded not only by teachers, but by their peers as well. A teacher at The Young Women's Leadership School described the value students placed on academic success at the school: "It's cool to be good at math. The coolest girls, the most popular girls are also the ones who work the hardest and achieve the most."

Behavioral problems were minimal because of the steadfast focus on student learning at the schools. These highly effective schools were places where a tangible sense of hope existed. Teachers liked coming to work and students knew they were expected to take school seriously. Students also knew that they would be held accountable by multiple adults at the school for their actions. A teacher at The Young Women's Leadership School summarized how teachers and students approached teaching and learning at the

school: "In a lot of schools, there are a lot of teachers out there who are judged by the (amount of) time they are at the school because that's where they are. But I think that everybody here wants to be here…" Furthermore, "I think when they [the students] come here, they're going to learn and they want to be here to learn."

In addition to hope, a strong sense of caring was evident at the participating schools. For instance, at The Young Women's Leadership School, every student was in an "Advisory" group with a teacher who kept track of the student's academic performance. The Advisory groups also promoted the development of strong personal relationships among teachers and students at the school. At Ysleta Middle School, there existed a very strong community outreach program that actively engaged parents in their students' educations. A student at KIPP Academy New York summarized the feeling of being cared for by teachers, a sentiment shared by many students at the participating schools: "They'll really do a lot of things for you, like they'll leave their cell phone on all night even if you have to call them just to say hello, or just to see how you're doing. Or they might call you to say hello and it's like, it's a real close relationship. It's like what you'd have with your parents."

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