Teachers and administrators of Ogden Elementary School (Ogden, Kansas) had a problem. The school had had a pattern of poor student performance at least since 1991, when the Kansas State Assessment was implemented. Ogden had failed to reach the state standard of excellence (25% of tested students scoring in the "exemplary" category; 5% or fewer scoring "unsatisfactory"; scores meeting or exceeding an established distribution) in all areas for a decade, and the school consistently had scored lower than all other elementary schools in its district. The pressure on teachers and administrators was building.

In spring 2001, the news again was disappointing. Scores from the state mathematics assessment showed Ogden students were below the state and district average in math performance, and they had failed to meet any of the criteria for the state standard of excellence.

Teacher leaders in the school contacted mathematics educators at Kansas State University, seeking assistance through professional development opportunities for their teachers. In 2001, staff developed and began implementing an action plan, collaborating with university faculty and other professional developers. The results were quick and dramatic: In 2003, 4th graders at Ogden Elementary School significantly increased their performance on the state assessment test.

Although the professional development focused on math, students’ reading scores also improved in subsequent years. The rise in student achievement was a result of the changing culture within the school and teachers applying teaching philosophies they focused on in their professional learning.

OGDEN ELEMENTARY SCHOOL

Located in a rural community adjacent to an Army post and 10
miles from the larger community of Manhattan, Kansas. Ogden has its share of educational challenges. Many of the town’s residents have ties to the military, which accounts for a 60% student mobility rate. The elementary school is a Title I school that serves at-risk 4-year-olds and Head Start children. The students, reflecting the community’s overall demographics, have a high level of educational need: 64% receive free and/or reduced-price lunches; 28% are minority; 12% are enrolled in special education; and language development is commonly delayed by as much as two years (13% qualify for speech therapy).

Ogden teachers were working hard, but were frustrated by a perceived lack of support from the school administration. A new assistant principal and a teacher leader in math got together to take action.

**DIAGNOSING THE PROBLEM**

In summer 2001, the acting assistant principal contacted a new faculty member at Kansas State University to discuss ways to improve students’ learning in math. The assistant principal assembled a planning team of the school’s lead math teacher, the principal, and the faculty member to examine the school’s concerns.

As the initial four met, the discussion began to surface three main issues:


2. Teachers were teaching with a conceptual framework that was not aligned with the curriculum. *Investigations* is a problem-based curriculum in which students learn using a constructivist approach, building understanding through guided interaction with mathematical situations. Teacher-directed, teacher-centered learning was the norm at Ogden.

3. The scope and sequence of the K-5 mathematics curriculum was not clearly defined or delineated. The curriculum was being implemented in part in some classrooms and not at all in others. Teachers were not communicating across and within grade levels. Teachers were unaware of the expectations of teachers in higher grades and did not know what concepts had been taught the previous year.

To address these issues, the university faculty member provided an initial half-day professional development session for all staff focused on learning math from a problem-solving perspective. The session emphasized process-oriented teaching, and the faculty member focused on problem solving as identified by *Principles and Standards for School Mathematics* (National Council of Teachers of Mathematics, 2000).

In this session, the staff identified problem solving as a major issue in math scores. The university faculty member proposed a long-term solution, offering to write a grant for financial support for more sustained professional learning. Staff supported the idea.

The assistant principal, lead math teacher, principal, and university faculty member formed a leadership team to develop a sustained, 18-month proposal for teacher learning, refining it based on feedback from teachers. The grant request was successful, and the Eisenhower National Clearinghouse for Mathematics and Science Education funded the proposal.

The money paid teachers for their time outside of contract hours, for summer workshops, and to receive graduate credit hours through Kansas State University. Teachers could participate in all activities or participate on a limited basis. Every teacher signed on.

Another change occurred at the school leadership level. Midway through the project, the district hired a new principal who began to focus on the school culture. The new principal supported teachers’ professional growth through released time and structured support of the original professional development project. Although every teacher participated in the professional development, a few were reluctant participants. The principal implemented a peer coaching project, asked teachers to hold each other accountable for using the curriculum, and asked them to offer each other feedback on their pedagogy. Within the shifting climate and culture of the school, the professional development became an effective tool for change.

**THE ACTION PLAN**

According to Susan Jo Russell (1997), “The best use of good curriculum materials is in the context of a long-term staff development program that engages teachers in ongoing reflection about students’ mathematical thinking” (p. 252). The planning team set professional development goals for an 18-month period set to begin in January 2002. The professional development was designed to address the issues the planning committee and teachers had identified. Teachers took part in three types of professional development:

**Book studies**

Book studies are a form of “study groups” (Loucks-Horsley, Love, Stiles, Mundry, & Hewson, 2003; Murphy & Lick, 2004) in which a book related to the specific issues teachers have identified is the center of study. The leadership team chose three books, developed guiding questions and activities, and facilitated the discussions during meetings twice a month at the school. Teachers met outside of
school hours and could opt either to be paid for their time or earn graduate credit.

Teachers began with concerns about the theoretical framework on which they based their mathematics instruction, so the study groups focused on books that offered perspectives on learning theory, curriculum, and students. During the first year, teachers read *Beyond Arithmetic: Changing Mathematics in the Elementary Classroom* (Mokros, Russell, & Economopoulos, 1995) and began to unravel the mysteries of how to teach conceptually. The book itself is based on the pilot implementation of the Investigations curriculum in an elementary setting. Teachers were able to see the struggles they faced acted out in the recorded thoughts of other teachers and to find solutions to questions they themselves were asking about the curriculum.

“This has been a difficult road for me,” said one 4th-grade teacher. “I tend to fall into the more traditional teaching approach quickly. I disseminate information and they listen, then practice and apply. I use this especially in math since this is how I was taught and I was able to do very well in math. Reading *Beyond Arithmetic* has caused me to reconsider my role as a teacher.”

In summer 2002, the 12-month book study series focused on *The First Days of School: How to be an Effective Teacher* (Wong & Wong, 1998). Teachers met at the assistant principal’s home in an informal, collegial atmosphere that contributed to their commitment.

These book studies helped teachers focus on ways to address issues related to curriculum, theory, and students while preparing to fully implement the *Investigations* curriculum in fall 2002.

Finally, in fall 2002, teachers read *A Framework for Understanding Poverty* (Payne, 2001), which helped them develop a better understanding of their students’ backgrounds and perspectives. The book also provided strategies to help teachers overcome the obstacles created as a result of poor living conditions and economic adversity.

“Ruby Payne’s book helped me to understand the situations my students come from and how that impacts their behavior and willingness when in my classroom,” a kindergarten teacher noted.

Teachers’ attitudes were beginning to shift.

Demonstration lessons

Along with leading book studies, the professional development team demonstrated lessons from the curriculum to model teaching practice. Three sessions during school professional development days immersed teachers in mathematics. Immersion in an intensive learning experience allows teachers to focus on the process of learning math through problem solving and to experience learning in a way that reflects the principles they are expected to use in their own teaching (Loucks-Horsley et al., 2003).

All staff, including special area teachers, took part in sessions in which university faculty presented several lessons from the K-5 curriculum. Teachers became students and worked on problem solving as the developers of the *Investigations* curriculum intended students to do. The focus was on developing knowledge, rather than delivering it. That shift in delivery is the root of conceptual teaching. Teachers began to experience the thinking and reasoning abilities the math problems were designed to encourage. They began to reassess their teaching practices and see the value in a conceptually based approach to teaching math.

“Having the lessons taught to us … put me in a position to learn some things that I don’t think I fully understood when I was learning that content in school,” a 3rd-grade teacher reported. “Looking at fractions that way was a new experience for me. I think I finally understood what my 4th-grade teacher never got me to see.”

These demonstration lessons allowed teachers to focus on and understand the pedagogy. The leadership team encouraged them to discuss their own understanding of math and how they developed different ideas through the learning process. The demonstration lessons formed the foundation for the next phase of professional development.

Model lessons presented to students

The third form of professional development, model lessons, consisted of taking the same lessons in which the teachers had participated as students into their classrooms. The model lessons again were based on the *Investigations* curriculum. The

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**Ogden Elementary School**

Ogden, Kansas

**Grades:** K-5

**Enrollment:** 185

**Staff:** 12 classroom teachers; 10 other certified staff

**Racial/ethnic mix:**

- **White:** 69.2%
- **Black:** 16.8%
- **Hispanic:** 7%
- **Asian/Pacific Islander:** 1.6%
- **Native American:** 2.2%
- **Other:** 3.2%

**Limited English proficient:** 4%

**Languages spoken:** English, Spanish

**Free/reduced lunch:** 68%

**Special education:** 28%

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**E-mail:** jima@manhattan.k12.ks.us

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Demonstration lessons allowed teachers to focus on the pedagogy.
professional developers modeled the lessons with the children while teams of teachers from the grade level and adjacent grades were invited to observe. The principal arranged substitutes for the teachers’ classes, or, in some cases, covered the class to allow the teacher the opportunity.

Using a modified lesson study approach, teachers were encouraged to watch the lesson and even ask students questions, but not to interfere with the lesson delivery. Immediately after the lesson, the teachers then met with the presenting teacher for a short session in the classroom while students were at specials to debrief and discuss both the pedagogy and content of the lesson. Teachers talked about students’ thinking during the lesson.

As a result of these model lessons, teachers developed a deeper understanding of the math being taught and of the learning theory on which the lessons were based. In addition, the teachers were able to observe and question unfamiliar pedagogical practices to develop an understanding of the appropriate use of a strategy within the scope of the lesson.

“Having the university folks come into the classroom was a real eye opener for me,” reported a 5th-grade teacher. “I have had problems in the past with how to teach a particular lesson. Since they were asking us for ideas to model in the classroom, I chose one of the difficult lessons. When I saw it being taught to my students, I was able to make some of the same connections that my students were. This was an amazing revelation.”

**Impact on student achievement**

The teachers aimed to improve 4th graders’ state achievement scores. In the next state assessment after the staff development, 4th-grade math scores at Ogden increased dramatically. In the year before the staff development, 52% of 4th graders were at

**Lessons learned**

Several valuable lessons emerged from the professional development project at Ogden Elementary School.

1. **Sustained, long-term professional development can have a significant influence on student learning.**

   Teachers’ professional growth takes time and must be nurtured just as students’ learning must be nurtured over time. The teachers, administrators, and university faculty made a long-term commitment to address teachers’ needs, an effort that affected student achievement. The long-term implementation allowed teachers time to process new theoretical perspectives and diverse pedagogical practices, as well as time to develop a revised perspective on the district curriculum.

2. **Involving teachers in planning their own professional learning contributed to selecting appropriate staff development strategies and enhanced teachers’ commitment to the process.**

   Through planning, the teachers developed a vested interest in the subsequent process. Teachers were consistently engaged in the professional development sessions. Their participation, even in the summer, demonstrated their commitment to improving their practice. The teachers actively engaged in reflection and dialogue in all the staff development sessions.

3. **Multiple approaches to staff development helped teachers improve their mathematics instruction.**

   Sequencing the professional development sessions over 18 months allowed teachers opportunities to develop insight into their own pedagogy as well as the pedagogy of their peers. Participating in math lessons as students, teachers were able to witness and reflect on the ideas from their book studies about teaching and learning math. As leaders presented these same lessons to students and the teachers observed, they were able to further reflect not only on appropriate pedagogy, but also on important mathematical content. Debriefing with the staff development team further enhanced their understanding of the pedagogy and content addressed by the curriculum.

4. **Dialogue among staff developers, teachers, and administrators, as well as reflection following teacher observations, provides opportunities for presenting teachers to clarify their goals for the lesson and allows observers to clarify their own understanding.**

   Perhaps the most significant lesson learned throughout the process was that teachers need time to process and clarify information. Teachers realized and acted on the idea that dialogue with colleagues and staff development personnel was a major vehicle for professional growth. Asking questions and reflecting on the responses helped teachers identify best practices for enhancing student achievement and encouraged them to implement those inquiry-based strategies.

5. **For professional development to be effective, building-level administration must be supportive.**

   A positive and supportive culture is essential to the success of long-term, sustained professional development. Had Ogden not had a change in leadership, some aspects of the professional development plan could not have been completed because the new principal’s support was crucial to change occurring.
the unsatisfactory or basic levels. In the year following, no students were at the unsatisfactory or basic levels; they all moved up to higher levels of performances. The combined percent of students at the proficient and exemplary levels improved in 2003 to 71%, up from only 44% in 2002. And 29% of students were at the exemplary level in 2003, compared with 4% in the year before the staff development (see chart at right, top).

Although a different group of students was tested, the pattern of performance on the state exam for the decade before 2004 shows students had typically rated both “unsatisfactory” and “basic.” For the first time, students had moved past the lower ratings.

Teachers were so empowered they began a similar focus on reading in 2002-03. The results showed in improved student achievement on reading, and in 2003-04, the school met the state standard of excellence in reading for the first time (see chart at right, bottom).

Teachers at Ogden are traveling a professional learning road paved with theories, both new and old. Their understanding of content has deepened, and their practices have changed to reflect new knowledge.

“I have come to focus more on allowing children to find answers on their own rather than showing them how to apply a specific strategy for problem solving,” said a 3rd-grade teacher. “It is amazing the strategies that they come up with — some we have never talked about in class.”

A 2nd-grade teacher said, “I used to focus on modeling problem-solving strategies for my students. I have discovered that trial and error on the students’ part is just as important as modeling a specific strategy.”

Although the challenges that students in Ogden face have not been eliminated, teachers have taken it upon themselves to ensure opportunities for themselves and their students to succeed.

REFERENCES


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**Ogden 4th graders’ performance on Kansas mathematics assessment**

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*School met state standard of excellence in mathematics.

**Ogden 4th graders’ performance on Kansas reading assessment**

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*School met state standard of excellence in reading.