Spokane, Washington

A City School District Struggles to Put the Pieces Together

Spokane is a socioeconomically diverse community located in the eastern part of Washington State, close to the Idaho border. The school district has 35 elementary schools (K-6) and 800 elementary school teachers, and it serves 17,850 elementary school students. The population of the district is largely Caucasian, with some Native Americans, Asians, and African Americans.

The impetus for reform in Spokane District 81 came from school administrators within the district. The district's major focus to date has been on curriculum selection, professional development, and science materials support. The district has a module-based, inquiry-centered science curriculum, and the majority of the district's teachers have been involved in professional development activities. The district has established a science materials support center, but it has been difficult to organize and maintain the center.

"Do the same creatures live in the little Spokane River as in the pond near my house?" asked a fifth-grader in Lorna Spear's class in Spokane's School District 81. "How can we find out?"

This question emerged from work on the module *Microworlds*, a Science and Technology for Children life science unit in the district's new inquiry-centered science program. The philosophy behind the inquiry-centered approach is that as much as possible, children's interests and questions drive classroom discussions.

In response to that question, Spear organized a series of field trips to try to find out what kinds of organisms live in rivers and ponds. The class collected specimens at both sites and took them back to the classroom, where they examined them under a microscope. They discovered that different organisms live in different bodies of water, and they concluded that this was largely due to the unique characteristics of each river and pond.

Spear, a lead teacher in Spokane's science program, believes that children need freedom to learn, so throughout the day, she gives them many choices. As a result, children spend time working in groups and alone, reading, and conducting scientific investigations. Spear has found that "children are more self-initiated and creative without my intervention."

"All types of learning are welcome in my classroom," explains Spear. "Another little boy was interested in exploring how the earth started spinning. We brainstormed about the problem in class. Then I encouraged him to go home and read about it. He came back to class with the same explanation that astronomers have come up with- that the big bang set everything in motion and gravity creates the pull among planets."

Planning the Science Program

Learning experiences like these become possible when a school district makes the commitment to implement an inquiry-centered program. Under the direction of Science Coordinator Scott Stowell, Spokane's science program is now entering its seventh year. Stowell and his colleagues used much of the information gathered at the 1989 National Science Resources Center Elementary Science Leadership Institute to develop a comprehensive K-6 science action plan.

The first phase of the plan called for an in-depth curriculum review and development process. According to teacher Jane Gorder-Harrison, the Leadership Institute made it "crystal clear" that a kit-based program was the best approach. The science committee spent long hours wrestling with the topics to be covered in the curriculum, getting input from teachers, and developing a comprehensive curriculum matrix made up of life science, physical science, and earth science strands, with special emphasis on environmental issues and technology. Once the strands were established, the district invited representatives from many companies to visit and present their products. The district piloted many modules, rejected some, accepted others, and ultimately filled in the curriculum matrix with modules from several national companies as well as some developed at the district level.

Professional Development Activities

As the modules were being selected, Spokane's professional development program also began to take shape. In June 1992, the district and its partners, Eastern Washington University and Partners-at-Large, a coalition of business, industry, and government agencies, received a five-year National Science Foundation Teacher Enhancement Grant. Stowell and Robert Gibbs, a physicist from Eastern Washington University, were named co-directors of the grant.

The following month, Stowell and Gibbs held the district's first summer institute for lead teachers. The institute lasted four weeks and provided professional development activities for 75 district teachers and 20 teachers from private schools. The institute's sessions were conducted jointly by classroom teachers and university scientists. The participating teachers now make up the cadre of lead teachers, who, along with school principals, work with teachers new to inquiry-centered science.

For the first three years of the project, typical staff development consisted of either two 10-hour sessions of intensive study of two modules or attendance at the 30-hour summer institute. The fact that teachers were given a choice proved to be popular with teachers and a real strength of the program. In both settings, teachers worked in groups and progressed through the lessons in a module, just as their students would do. Instructors modeled appropriate instructional strategies, such as implementing the learning cycle and asking different kinds of questions. The summer institute also explored other issues related to science education reform, including learning theory and assessment. Teachers appreciated the presence of knowledgeable university scientists and the opportunity to ask questions and learn more about the subject matter.

During the summer of 1993, 15 elementary school sent 93 teachers to the second summer institute, where lead teachers conducted many of the grade-level workshops. Gorder-Harrison, on of the summer institute instructors, recalls that "teachers start to act like kids; they can't keep their hands off the materials." The teachers' interest and enthusiasm soon spread to educators in school not yet involved in the program.

In fact, interest in the school district was so high that the remaining 20 schools in the district requested that they be brought into the program the following year instead of being phased in over a two-year period as originally planned. The administrators agreed.

Science Materials Support- The Critical Element

The decision to grant the schools' request was to create unforeseen problems in another area of the program- the science materials support center. Indeed, creating a workable materials support center is one of the real challenges facing school districts engaged in reform. A district such as Spokane, which serves 800 elementary school teachers, must supply kits to the schools, refurbish them, keep track of inventory, and pick the kits up on time. Although district leaders made every effort to plan up front and to consider every detail in the structuring of the program, sometimes circumstances make implementation difficult.

"Bringing in 20 schools in one year was too much," says Stowell. "We didn't have the space we needed or the personnel to serve that many schools. All the details need to be thought out carefully in advance."

The problems fell into several categories. One was space. A warehouse formerly used to store textbooks had been designated to house the kits. But the textbooks had not been removed in a timely fashion, so there wasn't enough room for the kits. The reason this situation arose can be traced to some of the challenges inherent in the process of planning and implementing a massive reform effort.

"We had some changes in personnel," Stowell says. "I had been working closely with the assistant superintendent on this project, but he retired. New individuals came on board who were not familiar with the logistical support that was needed. They were very supportive, but I guess I didn't articulate all the details clearly enough for them during the transition. As a result, the pace of moving the old textbooks out was not quick enough."

The jurisdiction for the science materials support center did not fall solely under Stowell's supervision, which compounded the problem. While Stowell coordinated the scheduling of the science kits, another department was responsible for operations at the science materials support center. So the issue became one of communicating the need to that office and solving the problem in collaboration with key individuals from other departments within the school district.

Problem Solving Is the Key

At this point, the district moved into a problem-solving mode. It had commissioned a study of the materials support center in the summer of 1994 to obtain all the information needed to get it up and running. Using the

study's report as a guide, the district brought in Robyn Norwood, an experienced manager, to supervise the center.

"We completely reorganized the space," she says. "We took the books off the shelves and made room for the kits. Once we had room to see what supplies we had, we could see what supplies we needed to order."

To keep track of the vast number of supplies, from beakers to bottles, wires to bells, tuning forks to radios, the staff at the materials center developed an inventory sheet. The inventory sheet ensured that the kits would be ready when the teachers needed them.

Along with keeping track of the inventory, Norwood and Stowell developed a workable pickup and delivery schedule. Instead of having all the kits delivered on an eight-week cycle, Stowell put them on six-, seven-, and eight-week cycles. That way, the staff at the center could refurbish one group of kits while another group was out with the teachers. The schedule also carefully delineated which teachers were to receive kits during specific time periods.

With the inventory and schedule in place, Norwood then tackled the issue of routing. Using the district's delivery system, she developed a routing system where geographical quadrants were served on a Monday-Thursday and Tuesday-Friday rotation system. Teachers who had requested kits knew exactly when to expect them and where to pick them up. Implementing this schedule kept the kits moving through the system smoothly.

Spokane's experience underscores how critical a science materials center is to the success of the science program. There are many details to attend to, and it is easy to overlook one or two essential ones. When that happens, it doesn't take long for problems to occur. The key to success is a well-thought-out plan and strong management at the science materials support center.

Moving Forward

With the science materials support center problems under control, science program staff are looking forward to a smooth road ahead. The teachers, too, have had additional time to fine-tune the skills they acquired during the professional development programs. The lead teachers as well as classroom teachers have been given the option of participating in advanced workshops. Also, a subcommittee consisting of the original lead teachers has begun to identify the essential learning goals for each module and to correlate them with the goals defined in state and national standards.

Many teachers, however, are still struggling to learn the basics. Co-Director Gibbs observed that much of the initial training focused on "nitty-gritty" issues of materials management, classroom management, and understanding the activities in the modules. Few teachers have reached the "expert" level, where they are able to modify the modules, integrate them with other parts of the curriculum, and bring in other materials to enhance the kits. Although lead teacher Lorna Spear agrees, she also notes that the program "has given teachers support and more time to talk to one another."

Fostering collegial relationships among teachers is one of the goals of the project and provides a way for teachers to grow professionally.

At this point, however, Gibbs says that "we have been able to bring most of our teachers to the level of mechanical use. That shouldn't be perceived as negative. What it means is that we are teaching science significantly better than we were before."

Lessons Learned

- The implementation process needs to be planned carefully. The pace of implementation should not accelerate beyond the school district's capacity to meet the needs of the teachers who will be participating in the program.

- The establishment of a well-functioning science materials support center is critical. Teachers can't teach inquiry-centered science without all of the necessary materials.

- Science program staff must be realistic about the goals of the professional development program. Most teachers will need to pass through a period of "mechanical use" before they master all the fine points of inquiry-centered science teaching.