

GOING THE DISTANCE FOR RURAL SCIENCE TEACHERS

California consortium develops strategies to provide science content professional development for isolated teachers

By Judi Wilson and Cathy Ringstaff

Teachers in rural settings find it difficult to access quality professional development that can improve student science achievement. These teachers are serving the 10 million students, or about 19% percent of the nation's total public school enrollment, who attend school in a rural district (Johnson & Strange, 2009). Studies show that long-term, in-depth methods of teacher learning are the most successful, but few professional development opportunities exist for teachers in rural districts, and access to university-sponsored resources is also limited. Rural teachers and schools are often invisible as they are dwarfed by the needs of larger urban districts in dense population areas.

To assist with science professional development for rural teachers, the San Joaquin County Office of Education's Office of Science and Special Projects in Stockton, Calif., formed a multicounty consortium of 26 rural districts and 44 schools and launched a major project to offer professional development to teachers in grades 4-8. The Science STARTS project (Science & Technology Achievement for Rural Teachers and Small Districts) was funded by the California Department of Education as part of the California

Math/Science Partnership initiative. California, the most populous state in the nation, has a significant number of rural teachers and districts. While the state has the smallest percentage of residents living in rural areas, it has the 8th-largest number of rural people in the nation (Johnson & Strange, 2009).

Rural teachers polled in preparation for the project offered the following professional development challenges:

- **Sparse or nonexistent curriculum leadership within the school/district.** No curriculum personnel for science existed within any participating Science STARTS school. Rural districts are often very small; some rural districts consist of a single school.
- **Remote locations and long distances between schools and support providers.** Access to quality professional development, especially intensive science summer institutes, often requires teachers to pay for room and board because of the travel distance. Professional development during the school year often requires driving long distances after a full day of teaching. Moreover, resources from universities and colleges are often beyond geographic reach.
- **Limited opportunities for sharing new knowledge and for teacher collaboration.** Opportunities for collaboration among teachers of the same grade level, with its infusion of new ideas — what Michael Fullan (1999)



calls “knowledge creation” — is often difficult when there is a lack of new information from the outside. Frequently there is only one teacher per grade per site in these rural schools, and several teachers who teach multiple grade levels.

While rural schools face challenges associated with professional development, they also have characteristics that can have a positive impact on student achievement. For example, rural schools tend to be smaller, more personal, and have lower student-to-teacher ratios than urban schools, which allows for more individualized attention. Students tend to feel safer than their urban counterparts, and teachers often utilize group learning techniques that are mutually beneficial for older and younger students. Rural schools have strong ties to the communities that they serve. Studies have also shown that in recent years, rural schools have higher graduation rates and fewer discipline problems than urban schools (Brown & Swanson, 2003). Rural settings are also ripe for science learning, since schools frequently have easy access to natural settings to enhance science lessons.

Science STARTS enlisted 30 teachers in a three-year program designed to enhance their science content knowledge, instructional methods, and reflective practice through 80 hours of learning per year. A key component of this professional development focused on improving teachers’ ability to implement the California Science Standards effectively,

as well as to learn strategies for teaching the many English language learners they were encountering.

Science STARTS studied the participation of its three-year cohort and learned much about rural teachers’ specific needs and how to serve this unique population. Moreover, we learned how to put structures in place that would survive once grant funding ended. These lessons are informative for both curriculum planners and implementers and for rural teachers who are struggling to improve their professional learning.

Rural teachers have specific needs.

Teachers in rural settings are often challenged to access high-quality professional development that meets their specific needs. Before we began the project, we surveyed teachers about their needs. Surprisingly, they requested face-to-face, rather than online, content learning to get out of their environment and maximize the networking and collaboration that a weeklong summer institute offers. While online options are beneficial for rural teachers, face-to-face opportunities are important and productive in building collaborations that exist long beyond the initial institute. Teachers were clear, however, about their need for the project to cover residential costs for the summer institute, and we were able to offer free room and board so they wouldn’t have to drive long distances during the institute.

NOW I REALLY UNDERSTOOD WHAT I WAS TEACHING

By Kelly Carr

I was first introduced to Science STARTS when student teaching. My master teacher and her colleagues would get together and brainstorm ideas, share investigations, and plan science lessons, then share the results with their respective grade levels. Their collaboration paid off in the classroom — the kids really learned difficult concepts (like elements) and had fun doing it! I was sold and became a Science STARTS teacher myself. As a teacher in a rural school, science professional development is not always available, and I felt I should take advantage of how Science STARTS was tailored to our needs.

What I knew about Science STARTS was that teachers got great ideas from other teachers. I was especially interested in science notebooking and experiments my students might enjoy. What I didn't know is that Science STARTS would teach me science content knowledge that I could then pass along to my students. Instead of getting a teacher's edition and hearing "teach it," I learned science in an interactive way at an adult level so that I could then go back and teach the kids — only now I really understood what I was teaching. After attending one summer institute, I finally "got" circuits and loved learning along with my colleagues. This continued when I went back to my school and participated in a cluster to discuss science and complete a project.

Not only did I receive in-depth science content training, but I have had opportunities to collaborate with other teachers from surrounding areas. The real power of collaboration is the ideas and activities I bring back and share with my students. This week, my class went on a water cycle journey. This was an activity I participated in while at the Science STARTS Summer Institute. ALL my students, regardless of level, now understand the water cycle; they had an absolute blast learning about it! I'm especially proud of a young man who has a very difficult time expressing himself, and who is diagnosed with Asperger's Syndrome. He was able to write a narrative describing his journey through the water cycle, and he was able to complete it independently. This is a huge accomplishment for him!

Kelly Carr is a 5th-grade teacher at Selma Herndon Elementary School in Livingston, Calif.



Carr

Networking and relationships through summer institutes are important.

Key components of Science STARTS were the three annual six-day summer institutes held at various colleges and universities in the region. Designed to improve teacher science content knowledge, these institutes were taught by a team of university faculty members with a science teacher leader. Three institutes were held in three different locations so that all teachers would not have to travel distances all three years.

Teachers consistently rated the summer institutes highly. Many, for example, stated that the content training was the best workshop they had ever attended, and most found the hands-on activities that were the centerpiece of the institute particularly valuable. A highlight of the project was the third-year summer institute, held at a rural community college, which aligned an existing earth science course to the California Science Standards and the teachers' needs. All teachers received community college credit for the summer institute, which included a two-day overnight field trip to a Sierra Nevada camp. Community colleges can provide valuable professional development resources to rural teachers as their courses can be appropriate for teachers and are frequently more accessible to rural teachers than large universities. Since most elementary teachers do not have a science degree, a wide variety of science courses at the community college can enhance teachers' content knowledge.

Teachers consistently shared how important the relationships they formed at the institutes were to them. They stated that staying in the college dorms offered in-depth opportunities for sharing and continued learning with other grade-level teachers, a rare experience for rural teachers, who are frequently the only teachers of their grade level at their school. The relationships built during these institutes have continued via e-mail communication among the teachers.

Clusters of rural teachers can be productive for ongoing collaboration and group learning.

After the summer institute, teachers were placed into teams of three to four based on geographical proximity. If enough teachers at a school participated in the project, they were on a school team, but, in some cases, a cluster was formed from teachers from multiple schools. The cluster met for a total of eight hours during the year to design and conduct a project.

Teachers presented final projects at a one-day symposium in the spring and represented major efforts that benefitted their sponsoring rural school. Projects included conducting an inventory of science equipment at the school, selecting and purchasing new science materials, setting up a school science lab, providing a school-based community/family event for science, or instituting a schoolwide science fair. Administrators at the sponsoring schools responded to all of the projects enthusiastically. Each project represented science leadership by the participating cluster groups. Comments such as, "We have talked more

in our grade level and between grade levels about science than at any other time,” and, “There is a lot more open communication among the teachers in STARTS” were common.

School-based science teacher leaders are an antidote to lack of curriculum personnel.

The Science STARTS project promoted a grassroots and inclusive definition of leadership. Teachers were encouraged to take action in areas that were important to them and fill the needs they saw in science at their schools. In addition, one teacher in each cluster received additional support. These teachers took on a leadership role by calling cluster meetings, keeping colleagues on track, and assisting the group in coming to consensus on the focus of the group project. Teacher leaders participated in 24 hours of learning in addition to the 80 hours required of all participants. They learned how to support and plan meetings and gained leadership skills specific to their roles, such as group facilitation and project development. Teacher leaders became important not only in the clusters but also in the organization of the entire project. Several teacher leaders presented at the summer institutes and assisted with the preparation of all project events.

Rural teachers are accustomed to taking leadership roles at their school site, since much needs to be done with few personnel on hand to help. Science STARTS simply harnessed those leadership skills. The cluster meetings at the school sites were valuable in changing the culture of isolation at the school sites, and teacher leaders were instrumental in making sure these meetings were productive. E-mail support, a project web site, and periodic face-to-face meetings of teacher leaders helped to solve problems

and support them in their role.

Rural teachers can benefit from leadership opportunities outside of the school to avoid becoming entrenched in a single grade level. Such leadership allows teachers to create and participate in learning from colleagues at other sites.

Science STARTS was, as its title suggests, a start, or a down payment on continued improvement of science education among 4th- to 8th-grade teachers at targeted rural schools. Judging from the continued enthusiasm evident from the teachers in the project, it continues to pay back dividends of quality science instruction for students. The project provided important information about what works for the many rural teachers who seek ways to improve their professional practice.

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