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Anatomy of a Small Failure

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Foreward

This story has two parts. The first sketches the 1991 workshop I designed and led for middle-school teachers in rural Georgia. A telecommunication effort was to be an integral part of the follow-up to the workshop—a way to keep participants conversing and thereby decrease their isolation. It failed.

In the second part, I detail the conditions necessary for success.

As the LabNet project progressed, one of the most important shifts in emphasis was toward collaborating with teachers and providing ways for them to take initiatives. The most important example of this approach was the Big Idea Grant program of 1991-1992. The program enabled teachers to apply for funds from LabNet, primarily to design and lead workshops for other teachers closer to home. For many teachers, the Big Idea Grants were a step forward in their level of involvement. Assisting other teachers is a commitment to professional growth.

I carried out a Big Idea Grant in rural Georgia. In my workshop, I exposed middle school teachers to new ideas of teaching science by using hands-on projects.

Rural Middle School Teachers

I am an experienced physics teacher from a suburb of Atlanta. In my classroom, I have integrated projects to provide students with opportunities to learn physics by doing. Last year, some of my students' projects included appraising the physics behind karate moves, measuring the force of acceleration in motion of elevators, and building paper towers.

Over the years, I became aware of the disparity that exists in my state in science-teacher training. I enjoy the relative wealth of knowledge and materials of a suburban school, which also benefits from constant training and professional development opportunities. All these advantages are part of being close to the center of things. Yet, I know that other teachers in Georgia do not fare as well. The situation of science teachers in middle schools is especially alarming. If some resources are available for science teaching, high school science teachers are the first to receive them, whereas middle school science teachers scrape for leftovers.

Many students have lost interest in science by the time they reach high school. In fact, Georgia is among those states with the highest dropout rates. With middle school teachers across the country having little or no background in physical science and lacking the pedagogical skills to interest students in learning it, the situation is a recipe for failure—especially in the rural South.

I found in a 1986 study that roughly half of Georgia's middle school teachers had fewer than 20 quarter-hours of science preparation; 41% had no science study within the last 7 years. In my application for the Big Idea Grant, I expressed my concern. I wrote, "We must make science exciting! It must be taught in a meaningful manner, stressing student involvement and cooperative learning through project-based problem solving. We must work to attract women and minorities into science at an early age."

I believe no one would disagree with my message. But very few rural teachers are reached. Many of the more remote districts lack a science coordinator, as well as the resources to bring high-tech hardware and applications into the classroom.

I decided to conduct my workshop in the southwest region of Georgia. There, surrounding the city of Brunswick, an affluent resort area, are some of the state's poorest counties, with the highest percentages of minority residents (65% to 80% African American) and the most heavily rural populations.

My aim was to excite the teachers about science. I wanted to boost their motivation to work with students. At the same time, I wanted to expand the teachers' knowledge of science, and to provide them with simple and inexpensive ideas that they could use with their students. I believed that if I could build a cadre of teachers who were excited and ready, chances are that they would carry their learning and enthusiasm into the classroom.

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I convinced the McIntosh County district to serve as the site for the workshop. The local educational administration gladly provided all the needed resources to ensure that the workshop would take place. At the same time, I informed the Georgia department of education of the workshop and left it to them to select two teachers from each of the nearby school districts. I insisted on a pair of teachers from each district, knowing how hard it is to introduce change when working alone.

The response was overwhelming. The workshop quickly filled with 24 participants from 12 surrounding districts. Some of them, not having enough money to stay at Dorian (the site of the workshop), commuted 80 miles each way to attend. For nine teachers, this was their first workshop, and for another seven, it was their second. The majority of participants were women—which is the opposite of the often male-dominated science departments in high schools. Five were African Americans.

In their evaluations, 19 of the participants felt that the workshop met their needs "a great deal," and 5 said that it "somewhat" met their needs. For roughly two thirds, the reason the workshop met their needs was that they learned about new teaching approaches. Indeed, 22 participants felt that they would "definitely" integrate ideas from the workshop into their classrooms. Most importantly, participants left with enthusiasm to integrate their learning and to continue to seek opportunities to pursue their professional development.

For me and my staff, the workshop proved to be a test case for meeting the needs of middle school teachers, especially in rural areas. The local school district asked us to come again to introduce more teachers to new ways of teaching science. That sense of urgency was shared by many of the participants. One teacher wrote:

> Most middle school teachers do not have enough training in science courses. We *must* keep students asking questions about things they use and see every day. We must be able to answer these questions for them and create interest in the field of science. We need *more!*

To me, that meant preparing my show for the road, looking for additional interested sites, or perhaps returning to McIntosh County and strengthening the new starts for these science teachers.

The Telecommunication Failure

Telecommunication among science teachers remains a largely untapped resource in Georgia. Although no study has been made to develop specific figures or comparisons to other localities, telecommunication among teachers in this state seems to be limited to members of the Georgia Science Teachers Association Board of Directors, science supervisors in large school districts, and the education departments of several colleges and universities. They welcome participation by classroom teachers; but nothing has been done to vigorously promote telecommunication in the state. Most teachers do not know the medium is available and no training is given on how to access the network.

As part of a 7-day workshop held in rural southeast Georgia during the summer of 1991, I introduced the concept of telecommunication to the participants as a method of networking among teachers and as a source of ideas and data for teachers and students. The participants were enthusiastic and anxious to get on-line.

All of the participants in the workshop were from rural, underserved schools. They tended to be isolated; for most, this was the first workshop attended. In fact, few workshops had been offered in the vicinity during their entire teaching careers. The counties do not have science supervisors, so these teachers were ideal candidates for telecommunication. On-line discussions and exchanges of ideas, new methods and laboratory experiences—both would have greatly relieved the isolation they experience.

The only network currently available in the state on a wide scale is PSINet, which was set up several years ago by the State Department of Education in collaboration with some state universities and colleges. PSINet, however, has limitations that made participation difficult for most of these teachers. It can be accessed only with IBM equipment, whereas most of the teachers in the workshop had Apples. Software was developed for the Macintosh, but has been rife with technical problems and has not been successful. The system also has few local telephone numbers, and these are only in the urban areas. Communication for all of these teachers would be by intrastate long distance, which can be expensive. The system has a bulletin board, but quite often there is little of value on the bulletin board that the teachers could incorporate into their classroom experience. The network seems to be used almost entirely for e-mail. It simply was not worth the time, effort, and expense to these teachers to pursue telecommunication.

Two years after the workshop, none of the participants is on line on any system, with the exception of Prodigy, which some use at home for news items and as an encyclopedia reference source. These teachers are as isolated now as they ever were.

My attempt to introduce telecommunication as the medium for maintaining the enthusiasm of the workshop was a dismal failure.

The Elements Needed for Success

To meet the needs of science teachers isolated by geography or discipline, a system is needed that is versatile, user friendly, accessible by local telephone service, and used by enough fellow teachers to ensure on-going dialogue. Many people who use telecommunication check the bulletin board and their e-mail daily; others communicate less frequently. A large population with access to the system ensures that some information will be on the system and changing daily.

Versatility requires that the network be compatible with a wide range of computers: MS DOS, Apple, Macintosh, Commodore, and so on. Most teachers in the Southeast use Apples, although many are gradually changing over to IBM and Macintosh. It is also helpful to have both bulletin board and e-mail capabilities. It is even better if the system supports real-time online dialogue and conferences, so that teachers can communicate with each other on an instantaneous basis. The system should provide for transfer of text files and graphics, and from the system to individual computers so that teachers can download and upload information quickly and economically.

The more versatile the system, the greater the number of teachers who could use the network. As much as possible, a network should be accessed by a local telephone call. This is essential if teachers are to telecommunicate from their classrooms and make telecommunication available to their students. Many school systems do not provide teachers with unlimited access to long distance telephone. Start-up and maintenance fees should be as low as possible. First, rural teachers have extremely small budgets. Second, elementary and middle school teachers have smaller budgets than do high school teachers: Many elementary teachers in Georgia have an annual science budget below $100. Yet, these are the very teachers who most need the networking capabilities of a telecommunication system.

A network should be user-friendly. The vast majority of the population—including teachers—is not entirely comfortable with computer technology. The friendlier the system, of course, the more likely people are to use it and to experiment with the many options available on a complete system. User friendliness is enhanced through extended use of icons and a system that is as menu-driven as possible. Colorful graphics also make the system seem friendlier to the computer novice. America Online is an excellent example of a non-threatening telecommunication service.

Rural teachers—indeed, isolated teachers in general—could be well-served by telecommunication. The contact with other teachers both for support and for resources regarding laboratory ideas, project ideas, and technical information could make a substantial contribution to their classroom teaching. And once teachers become comfortable with telecommunication, they then can make this technology available to their students for research and networking. It is too powerful a tool to remain untapped.

Unfortunately, telecommunication among science teachers simply does not happen in Georgia at the present time. This particular effort failed, but we should not give up. Given the elements for success outlined above, telecommunication shows considerable promise for teachers in general, and, in particular, teachers in rural communities.