A Community of Learning

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Foreward

Elmira High School serves the small town of Veneta (3,300), the adjacent unincorporated community of Elmira (1,500) and the outlying communities of Noti (400) and Walton (300), total population 5,500. Veneta-Elmira is 15 miles from Eugene-Springfield, a metropolitan area of about 175,000. Eugene is home to the University of Oregon and major industries, and is separated from Veneta-Elmira by a wildlife refuge and a large reservoir.

Set in the foothills of Oregon's coast range, these small outlying rural communities accommodate an eclectic mix of lifestyles, avocations, and tastes. Although they increasingly serve as bedroom communities for Eugene-Springfield, their roots are still in the declining timber industry and in agriculture. The area has become an important part of Oregon's burgeoning wine industry, a variety of artisans and craftspersons do their work in this scenic and relatively inexpensive hinterland, and Veneta's biggest claim to fame is the Oregon Country Fair, the largest annual counter-cultural gathering in the country, if not the world. It is a place undergoing change as the tentacles of Eugene-Springfield reach farther west and highway improvements make the area more accessible and attractive to those with the money to build and commute.

Nonetheless, a cow pasture still lines the quarter-mile drive leading to the school, set against a backdrop of tall firs and rolling hills. Students participate in 4-H, raising pigs and sheep to earn money for school clothes and cars. This morning a local elementary school principal brought in extra buses and warned parents not to let their children walk to school because a cougar has been spotted in the neighborhood and killed a family dog, and as I drove to work today I saw a pair of bald eagles.

I went to Boston in the summer of 1989 to participate in the first teacher training workshop for LabNet. With only one year of teaching experience, I brought little more to the workshop than an insatiable appetite for new ideas and a bullheaded youthful spirit. I was taken by the idea of self-directed students working on projects with a community of peers linked by telecommunication, and I was excited by the potential for teachers to share and learn from each other using this same tool.

Now, nearly four years later, it is evident that LabNet has been the single most important influence on my career. Furthermore, my experiences with telecommunication and Project Enhanced Science Learning (PESL) have not only impacted my students, my colleagues, and my administrators, but the entire school community. As I reflect on the influence that LabNet has had on all of us, it is apparent that the two components of LabNet—telecommunication and PESL—although inextricably linked, have affected me and these different groups in different ways.

Thinking back to that initial workshop, I recall hearing someone with whom I was very impressed say that he had a class where students did nothing but physics projects. There was no other curriculum; the students chose their own areas of inquiry and developed their own methods of investigation. When I got home in the fall I asked my principal if I could offer such a course the following year, where students would do projects in any field of science, including social science, as long as they employed a scientific method of investigation. To my delight, my principal said yes.

Getting Started

The primary challenge upon returning from that initial LabNet teacher training workshop was to obtain the necessary equipment in order to get on line on the LabNetwork. In my building, however, where funds have always been closely guarded, obtaining the necessary equipment—a computer, phone line, and modem— meant launching a political campaign to convince my principal, superintendent, and school board that LabNet was a program worth investing in. The plan to offer a course where students could participate in original scientific research while linked with a nationwide community of peers doing the same was a definite selling point. There was something appealing

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in the idea that our school would be part of a national program that would put us in touch with other schools, other scientists, other teachers—with a community of interested parties that did not exist in Elmira. (Even though we're near Eugene and the University of Oregon, with an excellent library, research facilities, and scientific experts, many of our kids think of Eugene as another town, a place that they don't think of when they think of home.)

At this time, my district had a superintendent who was perceived as being difficult to work with. Nevertheless, I asked for what I needed: a dedicated phone line in my classroom for telecommunication. He said yes! He not only said yes, but he showed a lot of interest in LabNet. My principal was also supportive, and used funds from her discretionary account to purchase a modem.

Involving the school board in supporting LabNet was the most enjoyable part of this political campaign. They were familiar with the work I had done with microcomputer-based laboratories during my first year of teaching and they were interested in continuing to update the district science program. When I asked for support for LabNet, they saw this as another opportunity to foster a program that the community could take pride in. After all, this was a national, federally-funded science education program; it would put Elmira on the map!

Each year I have given the school board and superintendent an update on LabNet. I have demonstrated the ways that I have used LabNet in my classroom, explained that LabNet has provided financial support for our school's program (a small matching grant of $200 and a Big Idea mini-grant of $4,200), and my students have made presentations on their use of the network for their projects. These presentations, which often lead to articles in the local newspaper, have resulted in long-lasting support for LabNet. Although the superintendent who got me my first phone line is gone, we've had two superintendents since then, and both have been enthusiastic. My first principal is also gone, but my new principal is just as supportive; when asked to write about the star programs at our school this fall, he chose to write about LabNet. I don't think that this enthusiasm comes just from me or my contact with these people. They see something inherently important in linking our rural school with a broader community devoted to improving science education.

Students on the Network

It took me until the winter of 1990 to get on line (about 6 months after I returned from the first LabNet workshop). The following year I began the projects

class, and those students used the network to research their projects and solicit feedback on their experiments. They would write messages and I would log on, send them, and download any responses. I had a student who wanted to see if electricity could be generated from the temperature difference between ocean water and subsurface rocks on the shore. I suggested that he ask a physicist at MIT, who I knew was on the LabNetwork, for some help in setting up his experiment. He engaged in a dialogue with this professor and received some good feedback on the work that he was doing. This student took first place in the Engineering Division at a statewide science fair later that spring. His project also won a significant award from the Marine Corps, a scholarship to Pacific University (the host of this science fair), and he took first place at our county science fair. Every judge who interviewed him wanted to know more about LabNet and how he had used telecommunication as a resource in doing his project work. Since then, every project that students have completed as part of the projects class has involved telecommunication (either as a major tool in the research or as a resource for information and feedback), and nearly all projects have won awards at science fairs or competitions.

However, not all students' attempts at using the network have been so successful. There have been instances where student requests for help have been ignored. Also, some students have had a difficult time articulating their needs, making it difficult to respond to their messages. One student, putting a message on the network, asked for help in designing a project to compare open and closed ecosystems. She never received a response. It has been my experience that student messages are more apt to yield a response if they include specific questions that LabNetwork users can address, rather than requests for help or information regarding a broad topic. For example, last year one of my projects students wanted to conduct a survey of student attitudes about sports. She placed a request on the network asking teachers to distribute the survey in their schools and return the completed forms. Several teachers responded and she was able to gather data from high schools in each quadrant of the country.

The students in my projects class are not the only ones who use LabNet. I have conducted short-term projects in physical science classes where students have exchanged messages and ideas with kids doing the same project in another LabNet classroom. One of the more exciting examples of this is the Descent of a Ball activity where students must create a structure from paper and tape that will delay the descent of a ball dropped from a height of one meter. A couple of years ago my physics students exchanged messages describ-

ing their structures with students in Manassas, Virginia. The task of describing their structures verbally, without the aid of diagrams, was quite a challenge, as was the interpretation of the descriptions they received from our partner class.

My physics students use the network for ideas and feedback when they do independent projects during the spring. They recently posted messages regarding their projects for the third quarter. This morning we received replies for projects on holography, bridge building, radon measurement, and the strength of chicken egg shells. My chemistry students have used the network to share information about soil and water studies that they have conducted in their community and the surrounding area. Although their soil and water study was conducted last spring, they recently received a request for their results from students in Georgia who were in need of some comparative data.

It has been my experience that students seem to care more about the way that they report their projects when using LabNet. They edit their messages carefully and rewrite them—something they don't always do with the writing that they turn in to me. If they are working in groups, they all seem to want to have a say in what their message contains; it is not acceptable to let just one person do the writing. Students delight in sharing personal information about themselves and their school. They look forward to getting responses to their messages, and are disappointed if there aren't any. (I didn't even have to announce that the physics students had received responses to their messages this morning: They were crowded around the bulletin board where the messages were posted before class had even started!)

When telecommunication is involved, they feel part of something whose significance transcends the classroom. They are engaged in their own process of communicating with others and evaluating their work. The key is that it is their own. Students aren't just turning in a project for a grade or for me to read. It is something that is theirs and that they are sharing with a community of which they are a part. This evokes a different type of enthusiasm for the work they are doing; it validates their work and gives them a reason to respect it. They are learning to learn from others, just as real scientists do, just as we all do outside of the classroom.

LabNet has allowed our school to become a place where students do award-winning science projects and where any student taking science can be part of a telecommunication network. Student experiences with PESL and LabNet have fostered a genuine school-wide interest in the science program. Our school newspaper now routinely reports on projects that students are

doing in my classes, something that rarely happened before. Physics projects are proudly displayed at a spring festival, and class projects and activities are often the feature of a student-produced weekly school news video that is broadcast in each classroom via Channel One.

A Teacher on the Network

Like my students, I also use the LabNetwork to get ideas and feedback. I've obtained many ideas for projects, activities, labs, and demonstrations from teachers on the network. As a new physics teacher with a degree in chemistry but only one college physics course to my name, I find this resource invaluable. Last week, I received a lab on friction from a teacher in Texas. Now I can use my computer force probes for something other than dynamics experiments. I also got the idea for my second quarter physics project, the King of the Hill Contest, from a LabNet teacher. (In this project students must devise cars powered by mousetraps and rubber bands that are capable of crossing over a hill and preventing their opponent's car from doing so from the opposite direction.) Furthermore, it was a LabNet teacher who suggested that I look to local businesses to help fund student project work. (I have been raising about $400 a year by following this teacher's advice.) And like my students, who feel that their work is validated when they are able to share it on the network, I feel validated when I can share my ideas with others who support the work I do.

The support that I get from teachers on the LabNetwork, teachers who share my enthusiasm for PESL, is different from the support that I get from colleagues in my department. While my colleagues do like to share ideas, they have seemed unwilling or unable to adopt PESL methods or to make use of the LabNetwork. When I received a small grant from LabNet to train them in telecommunication and to develop curricula, they were initially enthusiastic. However, their enthusiasm faded and their follow-through with the project was marginal. They did use the network themselves for a while, but their students never did the projects they had developed and never used the network.

Unlike me, my colleagues did not get hooked on telecommunication or PESL. The technical side of things was difficult for them. Neither of them had used computers very much before, and they weren't familiar with Appleworks or the telecommunication program we were using. The technology did not seem user-friendly to them, and I'm not certain that they were convinced that students would benefit from this type of classroom experience. In addition, they viewed the

process of engaging in a project with students and using the network as a big deal, something they had never done before, and I believe that they may have been intimidated by this or uncomfortable with the process of navigating through uncharted waters.

My colleagues did not have the experience of working with the LabNet community during workshops and training sessions. They were communicating with strangers; there were no familiar names and no faces to associate with any of the messages that they received. My experience has been that this type of connection with others on LabNet has kept me on line, motivated me to respond to messages, and encouraged me to feel free to post comments of my own. Those of us who have participated in LabNet workshops have continued to build upon the relationships that were forged during these summer trainings. For us, using the network means continuing to work with people whom we trust, people with whom one easily can take risks. The familiarity that we share has allowed us to expose our areas of expertise, as well as our weaknesses. There is a niche for everyone: the "techies," the philosophers, the pedagogues, and the pragmatists. It is unfortunate that my colleagues were unable to find their niche within this community.

But if I'm honest, I must admit that, like my colleagues, I have failed to take full advantage of the opportunities that LabNet presents. I really could use the network more. I could log on more frequently, and I could make more of an effort to respond to other peoples' messages and questions. (Although I do quite a bit of this type of thing already, messages often sit on my desk a week or two before I manage to send a reply).

I also could train more students to use the network (right now I have only one student who checks the network each week). Most importantly, I could incorporate telecommunication into more of the activities that take place in my classroom, and I could have students post more messages about the work they are doing. I still feel like telecommunication is something that I do more than my students do. It doesn't play a central role in my classroom. Projects do play a central role, and I often incorporate telecommunication into the process. However, I feel I have only begun to explore the many ways in which the network might be used with students.

Reflections

My comments above beg the question, Why is it that I don't do these things? I know that I have hesitated to have students use the network because I can't guarantee that there will be an audience for their inquiries. I can't guarantee that there will be a response to their

message. Indeed, at times my students have been rather disappointed to find that their messages went unanswered. Last spring when my chemistry students were doing studies of soil, water, and acid rain in our area, they posted results and descriptions of their work on the network. They requested feedback from other classrooms and asked other teachers if they would like to share similar data and information. There were no responses to any of these messages. Not only were there no responses after nearly a month of posting reports, but a week or so after our project was finished, I spotted a message on LabNet by a teacher asking if anyone was interested in doing a project on acid rain! This teacher was a regular network user; I was astonished that he had not noticed any of the postings from my students. Not receiving any recognition for the work they were doing really took the wind out of their sails. After a while, they were wondering why they should even bother continuing to share their acid rain information on the network. Students want to be acknowledged when they make the effort to use the network, and when this acknowledgment comes only from me and not from others in the LabNet community, they feel short-changed. In these cases, the feelings of validation, of belonging to a larger community, are replaced by familiar feelings of being invisible and unimportant.

Furthermore, students do not naturally or spontaneously use the network. Using telecommunication remains a conspicuous event. Students write messages most often because I have assigned that task as part of their project work. Because students don't telecommunicate regularly, and because using a computer and modem is not part of their daily routine, putting messages on the network and articulating ideas for presentation to others stands apart from other routine classroom activities. With the limitation of having only two computer-modem work stations, I find it necessary to have students write their messages on paper. Once the messages are collected, I type them up myself and log on and send them. Thus students don't have much concrete experience with telecommunicating, and although they can understand the concept of the network and have even seen me demonstrate use of the network (something I have done using an overhead projector display interfaced with the computer), LabNet is still an entity with which they have only indirect contact.

Obviously there are some problems with LabNet and with telecommunication in general. Use of a telecommunication network would be much easier if computer-modem communications were more familiar to students and teachers, if it were second nature to everyone, and the equipment were abundant and readily

available. But psychological barriers to network use are at least as significant as any barriers due to technology, resources, or training. Why is it that very few LabNet teachers have engaged in collaborative projects where students share information over the network? Why is it that new network users often fade away and do not become permanent members of the LabNet community? Why is it that students and teachers sometimes receive no response to their network messages? What are the effects of using telecommunication and PESL on student learning? Are there other successful networks with similar objectives that could be used as a model for LabNet? These are questions that the LabNet community struggles with. We have a wonderful tool at our disposal, one that we believe enriches the educational experience. Much of the potential, however, remains untapped.

LabNet's potential for overcoming the boundaries of place is especially important for rural teachers. I am the only physics teacher in my district, the only chemistry teacher in my district, and the only teacher in my department who is using a project approach to teaching science. In other words, I am isolated. I'm physically isolated from other teachers in my subject area and other teachers who share my commitment to PESL.

LabNet lessens this isolation. It doesn't overcome it completely, however, as I am still separated from my LabNet colleagues by many miles. But it provides a tool for traversing those miles and gives me access to a community that has made a meaningful difference in my professional development.

Though LabNet's promise has yet to be fully realized, it has provided teachers and students with invaluable experiences in PESL and telecommunication. The beauty of the project lies in its structure. Not only has LabNet linked teachers electronically, it has linked them in an effort to explore a new method of teaching science. To do PESL, you need ideas and resources for projects. Telecommunication provides that. You need to trust that students will be able to come up with good ideas, good ways to solve problems and to meet challenges. You have to believe that things will work when the teacher becomes a facilitator rather than an authority: on the same level with students and learning along with them. This can only happen if you are a part of a community of people sharing the same teaching values and believing that learning through projects is valid and important. LabNet makes this happen.