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ABSTRACT

Adopting and adapting electronic networks for classroom instruction requires refining and redeveloping. Teachers must discern which potential element or elements (for example, classroom projects, databases, or e-mail) operates best in their classrooms, for their students, and with their teaching styles. Teachers develop individual processes of technology adoption. For some, it begins with learning how to operate the hardware and software programs, but the adoption process embodies much more. Teachers delve into a personal process of integration as they learn how to integrate electronic networks into classrooms with an overburdened curriculum and limited technology resources and support. Success with integrating electronic networks is a process of learning about oneself, one's teaching, and the potential of classroom communications. This paper traces the experiences of a 6th-7th grade science and social studies teacher trying to adopt and integrate an electronic network in a classroom in a small rural community. The paper highlights techniques that were successful, barriers to the adoption of electronic networks in the classroom, and lessons learned from the experience. (Author/SWC)

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**Adopting Telecommunications: A Teacher's Personal Quest
Toward Implementation**

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"Looking at new educational ideas is like shopping for a new suit. I can try the new clothes, but if the shirt doesn't fit, take the pants. You don't necessarily have to buy the whole set each time."
(principal)

Teaching is a profession of creation. We examine materials, choose components, implement and recreate classroom materials. Each day is filled with change. Seldom do we find a technique, a curriculum, or any educational idea that doesn't need recreating in order to mesh with our style or students. It is rare that we "buy into" an entire "suit". Refining and redeveloping is an art that most teachers find thrilling.

It is much the same with adopting and adapting electronic networks (En's) for classroom instruction. Teachers must discern which potential element or elements, i.e. classroom projects, data bases, email, operates best in their classrooms, for their students, and with their styles.

Bertrum Bruce and I have been involved in a number of new classroom initiatives, but few efforts excite us as much as introducing teachers to the power of classroom ENs. The more we take part and learn, the more we come to believe that teachers develop individual processes of adoption (Bruce, 1990; Harris, 1993). For some, it begins with first learning how to operate the hardware and the programs, but the adoption process must embody much more. Teachers delve into a personal process of integration. This is the issue of learning how to integrate ENs into a classroom of 25 children, an already overburdened curriculum, and limited technology resources and support. Each day, there are steps forward, backward, and even side-to-side as teachers assess what they are doing, what they dreamed of doing, and how to reach their goals. Success with ENs is not getting it "right" on the first day or using it exactly as others do but, rather, the process of learning about oneself, one's teaching, and the potential of classroom telecommunications.

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As teachers, we feel a strong sense of loyalty to and empathy with K-12 teachers who are overworked, have poorly equipped classrooms, and limited time with which to undertake ENs. We believe there are a variety of tenable reasons why so many teachers find it difficult to learn and integrate ENs into their classrooms. In order to better understand some of the roadblocks associated with EN use, we have compiled stories of individual teachers striving to implement ENs. In these stories, rest copious examples of why so many teachers find EN adoption difficult, as well as accounts where EN has found its way into classrooms.

One such case study involves a 6th/7th grade science and social studies teacher, Mitch, who was determined to adopt ENs. This story highlights what worked and just as important, what stood in Mitch's way.

We followed Mitch's journey for over 16 months. In this time, we assisted with the inservice sessions he attended, interviewed him, observed his classroom and traveled with him to make a national presentation. During these months, Mitch came to view the adoption of ENs as a process and in so doing reinforced our beliefs that integrating ENs is an individual journey into teaching goals, philosophies, and self reflection. The following is Mitch's story and what we learned through his journey.

"As a teacher, I'm like a cheerleader, because you have to get that self-esteem to the point where they feel like productive human beings. Once you've got their self-esteem, then you've opened their interest. You have to be on your toes, you're an actor. You have to change hats. But if you are not excited about teaching, they will not be excited learners. I say a little prayer each day---Lord don't let me be a bore." (Mitch)

Mitch had been in the classroom for twenty years. He was teaching five classes of sixth through eighth grade science and social studies in a small rural community which Mitch described as economically depressed. He was fondly known by a few of his students as Rev. Hoyt. He would often use a preaching tone of voice that suggested he was pleading or preaching for their attention. Mitch worked hard to connect his lessons with real-world situations.

"You can't afford not to listen-stay with us. Now think how this might work at home." (Mitch pleaded)

Mitch's classroom was exceptionally small, in that it could not seat more than 20 students. When observing, I noted the east row of four students had to stand and fold their chairs as the bell rang to allow the rest of the class to exit the room. In Mitch's words, "I'm crowded. I have a computer in a classroom that has an average number of about 18 kids in sixth, seventh, and eighth that rotate into my room, and we're wall to wall desks.....the room is used every hour of the day."

Mitch was among the first of 75 Illinois science literacy teachers inserviced on an early telecommunications network known as FrEdMail, Free Educational Mail. FrEdMail was established in 1986, free of charge for K-12 classrooms. It served to introduce telecommunications to both students and teachers and is currently known as the Global School Net. During the inservice where the teachers were introduced to ENs and given the necessary hardware, Mitch was thinking and formulating plans for how he could use TC within his classroom.

"I wanted it to be the nuts and bolts of my science and used everyday. Kids would network on individual science hypothetical situations. They could gather information at this end and send it out over the network to other schools and look at the statistical analysis of one given set of variables. This would help them become literate in the hypothetical research design and scientific method used in science fairs and science textbooks. We could do this since all the teachers that had the science kits have the same materials. We could all replicate the same experiment and send the data over the network." (Mitch)

Mitch returned to his school and shared his enthusiasm with his principal, who supported Mitch's dream of using ENs. In the principal's words, "I'd like the students to be aware of a world greater than our town--different ideas, people, and ways of looking at things." He saw ENs as a means by which his rural students could broaden their experiences and break the isolation of a small rural classroom.

With the small rural school's extremely tight budget, the principal had to find an innovative approach to use with the local school board concerning funds for the additional phonenumber. He knew that the board was conservative with both funds and educational strategies, so he developed a plan that convinced the board of the merits to having a classroom phone connection. At this time, the community was concerned

about an earthquake that was predicted to take place in this region sometime soon. Extensive media coverage recommended that this region's people should plan and prepare themselves. Mitch's principal went before the board and argued that if the quake destroyed one portion of the building, another section should have phone access to communicate with emergency officials. The board granted his request for a phone line immediately. Mitch's enthusiasm and administrative support was such that within one week, Mitch had his phone-line installed in his classroom and was logged-in to FrEdMail. In Mitch's words, he jumped right in with implementing FrEdMail.

"Don't be afraid to make mistakes. I'm hoping that is why we (teachers) are so slow. Teachers tend to be very careful and they need to be a little bit kid-like and just jump into it and go for it." (Mitch)

He was anxious to get started and readily emailed other teachers who had attended the inservice and were just getting online. Mitch was hoping they would share his vision for ENs, which was science experiments and data exchanges. This practice would give his students the opportunity to contact other students who would be doing the same experiments and then compare results and variables. Mitch had few replies, but none of the teachers wanted to participate in this type of project. This initially frustrated Mitch and soon he had to reconsider what he wanted to do with ENs or stop trying.

Without other teachers willing to involve their classes, Mitch began to focus on how important it was that each of his students learn how to log-on, operate, and log-off the network. He wanted his students directly involved in each step of electronic networking and ready if other classrooms decided to exchange experiments with his students. Online projects which he could send and retrieve were important, but not as important as having each student use ENs to build their computer skills.

"Without my students wanting to use it, I would not have been interested. I wanted something that they could be involved in, running the hardware and software." (Mitch)

As the weeks rolled by he began to feel frustrated with finding the time to teach each student how to log-on, download, and log-off. It was also difficult finding time when students could use the computer. He would have worked with them during his planning time, but during that

hour, another teacher used his room. Mitch was so determined to work with students and to practice using the system himself that he rolled the computer into the gym and added additional wire to reach the phone jack in his room. This was short lived because of the noise and his fear that someone might hit the computer with a basketball. After times this was just too much trouble, too dangerous and noisy.

Still no teachers agreed to exchange science classroom experiments. His vision for FrEdMail was rapidly fading. Mitch's expectations were high, immediate, and complex. He felt he should be further along with networking and it should be a part of all he was doing in science, the "nuts and bolts" as he called it. The pressure Mitch placed on himself to be successful with the network in his original vision was evident.

Mitch felt institutional pressures, as well; some of which were more perceived than real. He discussed the need to develop hard evidence, something he could show his school board. Bertrum and I were never aware of any of these pressures from the board and definitely not the principal. In our opinions, the pressures appeared self inflicted as Mitch searched for rapid integration and tangible success.

At this point Mitch's principal wanted to help Mitch get a feel for success. On three different occasions, he took Mitch's bus duty and drove the one hour route freeing Mitch to work on the computer. Mitch used this time to learn more about the network and to log-on with individual students. He soon felt guilty and these sessions ended.

One way teachers in other schools dealt with the time constraints of learning was to take their school's computers home and practice. When I asked Mitch about doing this, I was astonished by his reply as he adamantly shook his head.

"Oh, no! There would be even more talk regarding the computer if I did that. Some people already wonder why I get to keep it in my room. If I took it home, oh boy!" (Mitch)

It was apparent that Mitch's school culture was not unlike others where some teachers feel a sense of ownership with school materials (Harris, 1993). Mitch sensed a certain amount of jealousy from other teachers for having the equipment in his room, as well as extra time and attention from the principal.

We began to realize the pressures Mitch felt had grown over time. He

not only confronted excessive physical and financial limitations, but also fought emotional and cultural despair. Mitch felt pressured to succeed in rapid tangible means and admitted guilt with garnishing special consideration with new equipment and the principal's time.

After nearly a year, I approached Mitch about attending and presenting his story at the National Science Teacher's Meeting in Boston. Mitch was quite concerned about using school funds and would not go if the money came from the school's operational budget. The money had to be found elsewhere or he would not go.

"With all the cut-backs, I can't take school money for this trip. I don't have the heart to take funds that might be for someone's supplies." (Mitch)

Again, his principal stepped in to support the process. He talked to the media and potential financial supporters even before Mitch gathered the courage to make a firm commitment. The principal assured me that no matter what it took, he would see that Mitch had the funds needed to attend.

"If we have to, I'll go to some of my golfing buddies who are business people in the community and solicit support. We might even hold a bean dinner here at the school—we will find a way."
(principal)

Ultimately, Mitch agreed to present at the conference, but only after he was assured that the funds would not come at the cost of his colleagues or students. Money was raised through a school/community bean dinner.

After the presentation at the national conference, some of the pressures he felt began to ease. He also discovered that the national presentation was more than his reward, but was shared with the community in a form of school pride. The presentation brought local media attention allowing Mitch and his principal to elaborate on their dreams for Ens and the future possibilities for EN use within the classroom. Through this reflection and reconsideration he began to reframe the pace of his new effort. He accepted the fact that progress with telecommunications comes more slowly than he had expected. It became evident to him that his school's physical, financial, and cultural constraints affected his pace. He realized that using ENs in the classroom was a continual process of adaptation and adoption.

"I think I expected too much too fast because I've looked around,

and I'm just as far along as other people, and I'm running into many of the same boogie men as everybody else. I thought maybe it was because of my situation, of being the way it is here in this school. I just have to stop pushing and let it happen. I'm kind of letting it seek its own level with each individual student."

(Mitch)

Mitch continued to re-examine and re-create his vision. He began to refer to EN adoption as a series of steps rather than an event. He needed to allow himself more time to practice and get comfortable with EN operation, to explore new ways and new visions for EN, while adjusting original goals; and to remove self-imposed deadlines and pressures brought on by himself and others.

Research has shown that educational change (Bruce & Peyton, 1990, Farley, 1992; Fullan, 1991) and technology adoption (Harris, 1993;) take time. Electronic networks have the potential to change the dynamics of a classroom, but in so doing, they may challenge the established beliefs and values held by teachers. Mitch is not alone in his discouragement and confusion. Other teachers and schools are asked to embrace reform efforts such as ENs which will affect how they view teaching and learning, as well as call into question existing philosophical and structural foundations within their classrooms, schools, and possibly their communities. As in Mitch's case, his physical conditions were extremely constraining, his time restricted, school finances limited, and at times, his cultural climate was cold. For school change of this type to be successful, there must be support for the entire adoption process. It could be fatal to ignore factors such as school culture (Goodlad, 1994). For technology adoption this process may also include enhancing and redefining teachers' belief systems on instruction (Bruce, 1994).

"For technology to be truly integrated as an important part of classroom instruction, several shifts must take place in instructional practices and attitudes. In some cases, teachers must evaluate and change their view of the classroom and learning" (p.67 Ryan and Copper). Teachers need time to learn, to talk and work with their peers, and solicit student views. These challenges can create tensions between old and new classroom practices (Bruce & Peyton, 1990). For others, there needs to be a role change, one in which power is relinquished in order to formulate a more shared learning experience with the student; one in

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which the teacher is facilitator rather than disseminator (Levin, et al., 1990). They need time to discuss and share ideas of how they might change their teaching styles, classroom arrangements, power structures, curriculum integration, and other issues associated with EN adoption. The process is continual and often painful as teachers not only learn how to operate new technology, but also how to envision new ways of teaching and learning. As Mitch's principal put it:

"Sometimes guys bat 300 hits out of a 1000, but rarely. You have successes and failures, but learn to be grateful for the ones that do excel. If somebody does something and it doesn't work, you have to be grateful that he was trying to do something as opposed to complaining to him about the failure. Teachers must not feel you are standing there with evaluation slips." (principal)

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