The WEB Project: Technology Innovation in Rural Vermont
By Fern Tavalin

Remember back to 1994 when AOL had barely 250,000 members and Apple was boasting about a new power computer that blazed at the incredible speed of 66 mhz. Then, imagine an innovative technology proposal to the US Department of Education entitled "The WEB Project: Creating a Web of Evidence" that referred to a spider's web and not the World Wide Web. These scenes illustrate the naiveté with which most of our nation approached what was about to become a major revolution in communication -- advanced and adopted faster than any innovation preceding it.

The combination of educational desires and industry-based, fast paced product improvement would quickly drive the WEB Project's vision away from the spider and into the net of the World Wide Web. Remembering the original, organic symbol of the spider, though, would bring us back to reality many times when the technology itself became too distracting or too virtual.

Our initial vision, maintained throughout the five year federal innovation grant, was to use new multimedia and telecommunication tools to demonstrate student learning of complex performances and to engage students, teachers, scholars, and artists in conversations about work-in-progress. From the outset, our goals were based in educational outcomes for students. We selected the arts, humanities, and social sciences as areas of focus because they were extremely under-funded and under-represented in the field of educational technology.

This article will relay a journey that has, through reflection, been described using models and structures. The actual development of the WEB Project was based in a belief that collaboratively looking at work (student performance, educational practice, innovative ideas) would lead to positive results for kids. With this as the backbone, we kept our eyes and ears open and explored what this might look like. In the spirit of the arts and humanities, we mixed intuition and systematic observation to learn what to do next. We firmly believed that technology would be a crucial tool to get us to our vision.

Building from Prior Experience

The WEB Project ideas stemmed from several initiatives that pre-dated its establishment and some very simple field-tests occurred before a proposal for funding was submitted. Most importantly, I had just spent three years working on the Assessment Team at the Vermont Department of Education (VDE), coordinating an arts assessment initiative. The VDE was instituting student portfolio assessments in math and writing across the state. The statewide spotlight on the discussion of student work created a receptive audience for our basic concept -- maintaining collaborative conversations about work-in-

progress. The Paul Foundation was willing to take a risk in early 1994 and funded the purchase of three Power Macs so that I could work with art teachers in two schools to build digital art portfolios. Through a distance learning grant, the Vermont state legislature also funded equipment purchases for a small network of music teachers to experiment with music composition in their classrooms and exchange them online.

Although digital portfolio systems did not develop in the original test sites, the trials were successful in that they provided concrete knowledge about the essential elements of working with multimedia in a school context. The early exchanges in music composition pointed toward design and interface improvements that enhanced the WEB Project telecommunications components.

Taking the risk of trying something that may or may not work is financially prohibitive at the individual school level, especially in poor rural and urban districts. Rural areas are also limited by a lack of experience with "cutting edge" scientific and technological advancements. When the original idea of the WEB Project was presented to some of the most forward-thinking educational leaders in our state, the response was, "What you want to do is fifty years away." For these reasons, federal support for our project was critical at the outset so that we could establish a proof of concept.

Having access to resources at a national level provided us with technical knowledge and gave us the visionary support to believe that what we were dreaming could actually come true. From these national connections, we discovered similar projects in other areas of the country. In particular, sharing with the Challenge 2000 Multimedia Project in California and the Electronic Learning Marketplace in Maine enriched our own growth.

As conceived, the WEB Project was a statewide initiative with two centers of focus, twelve individual schools and several content-based networks of teachers in schools whose communication would be based on projects developed by key statewide organizations in the arts, humanities, and social sciences. Support was to be provided by the WEB Project, community members, higher education, and students who knew how to use technology.

Mucking Around while Keeping a Watchful Eye

Internal research and external evaluation formed the structured learning components of the WEB Project, counterbalanced by attention to personal expression and collaborative production. After two years, we recognized three phases of questioning that have become helpful in guiding the success of subsequent ventures.

Phase One: How do I do this?
Along with the notion of new is the notion of how. With inexperienced users, the how concerns technology. Once basic level technology skills have been acquired, the how concerns appropriate pedagogy. In the case of innovation, "How do I do this?" is equally germane to project design, classroom implementation, and evaluation.

Our first training session with schools was very carefully planned and based on two years of prior experimentation. We articulated a progression from basic to advanced and planned to use an associated rubric as a tool to establish a baseline and measure progress. I had spent two weeks in San Francisco at the Center for Electronic Art working on a design team to build the first web-site for the Oakland Zoo. This gave me both a technical background and a sense of how professionals go about using multimedia technology. Upon return to Vermont, a multimedia artist and I planned the first workshop. In a friendly "get-to-know-you" opening session, we discovered that NO ONE in our group had ever used a computer. Suddenly, we did not need to administer an assessment tool to establish the baseline. Indeed, no one understood the terms we had used as descriptors. This crash course in reality brought project planning back to the ground floor, perhaps even into the basement. While we did not revise our vision, we certainly changed the approach! Our answer to "How do we do this?" became very different from what we had been originally conceived.

Phase Two: Is this worth pursuing further?
To adopt an innovation is a giant leap. Doing something new takes time and a natural question ensues, "Is the time spent worth the outcome?" In this phase, potential adopters examine the innovation to decide how it can be made better or whether it should be discarded.

An online literature exchange illustrates Phase Two really well. Teachers interested in strengthening student comprehension and reflective reading joined the Vermont Center for the Book and the WEB Project in a venture to figure out how to use telecommunication to meet this goal. An initiative called *Taking a Stand* was conceived as a way to foster in-depth online book discussions between students (grades 5-8) from different schools while the adults looked on and used the student discourse as a reference for their own discussions about the merits of the project. After figuring the "how to" in the first year, project directors and three designated teacher-researchers decided that *Taking a Stand* was worth pursuing, but needed further research to determine whether online discourse was helpful. A range of variables was listed as contributing to or impeding the goals of the project. Most significantly, the participant-researchers thought that using a uniform approach to discourse would reduce some of the complicating variables so that we could look at online discourse rather than professional practice in general. Phase Two discussions recommended further pursuit with a guarded view about usefulness of the online process. A plan for professional practice and an accompanying research design was developed so that we could base subsequent decisions on concrete data.

Phase Three: What are my students learning?
While this question is at the heart of instruction during all phases of well-conceived innovation in education, measurements of student performance cannot be reliably reported for several years. This is not to say that students shouldn't be assessed, it means that the results of the assessments are as much a function of the teacher's learning curve as they are of the student's ability to perform.

We organized assessment of student learning on many levels. Professionals in the arts, humanities, and social sciences joined in collaborative inquiry with teachers to build a notion of quality in the areas of historical research, multimedia production, reflection and critique, digital imaging, and reflective reading. Standards-based discussions about student work led to rubrics and exemplars that are currently online. The discussions also challenged whether the standards themselves were helpful. Teachers engaged students in conversation about work and several online conferencing systems were designed to foster collaborative discourse about student work-in-progress in the arts and literature. RMC Research Corporation also conducted an evaluation of the WEB Project that examined student learning based on a conceptual framework adapted from R. J. Sternberg's notion that "abilities are forms of developing expertise." At the school level, teachers built their own classroom assessments, with varying degrees of success.

In addition to collaborative assessment and project evaluation, teachers served as action researchers. The action research focused on critical project-wide issues such as:

1. Does critique of work-in-progress make a difference?
2. How can I document student problem solving in animation?
3. What are the benefits to reflective thinking in student online discourse?
4. How can we improve the professional development offered to the music composition network?

Technology as Tool and Terror

Very few participants in WEB Project initiatives have been blind supporters of technology. Being on the cutting edge meant that the industry itself was asking some of the very same questions that we were. As a result, many of the early products we used were released for sale in what might have been considered "alpha" phase; the programmers were asking themselves, "How do we do this?" We, the early users, gave error reports and the programmers then fixed the problems in "upgrades" or issued completely new versions. This meant that users had to be adept at determining whether a problem was a user error, a software bug, or hardware defect. Imagine the resulting anxiety to new and reluctant users, not to mention project level frustration over constant problem solving and continuous expenditures to improve software. Indeed, some of the companies whose software we adopted decided to go out of business after they segued into the "Is this worth doing?" phase.

Constant change and a climate with an unknown future forced us to re-examine our strategies once again. With so much re-tooling, it was easy to accept that our project was not about teaching software; it was about using technology as a tool. We knew and believed this going into the venture, but forgot once we began the journey. I mention this because it is easy to get lost in a computer morass. We have done this at a national level with the technology standards for all teachers. The articulated list is more relevant to what technology teachers should know than to what all teachers should know. The "all teachers" list can be shortened to two standards: 1. All teachers should understand and

use tools of technology that enhance a student's ability to learn concepts and acquire knowledge in a given area; 2. All teachers should understand and use tools of technology that aid in communication with colleagues, parents, and other identified audiences. Simple standards like these re-emphasize the purpose of using technology as a tool.

Once we remembered that our project was about learning and not about technology, we began to limit the tool sets we used. In turn, it became easier to focus on the essential pieces and to abandon "eye candy" and unnecessary functionality. Equipped with a notion of assigning "tool sets for all teachers who wish to _____" our professional development offerings changed radically. We no longer taught directly to software, we structured project-based learning environments and identified key concepts, germane to the educational goal at-hand, regardless of the software selected. To reinforce this, multimedia professionals at our summer institutes were asked to use unfamiliar software. In that way, teachers also learned how to learn and saw professionals doing the same.

An Example of Limited Tool Set -- In November 2001, two representatives from the WEB Project traveled to El Salvador to begin a planning phase for what will eventually become an exchange with a youth radio group at Radio Victoria. We provided training in the use of digital video editing so that we can share files. The limited tool set comprised three items: digitizing, assembling, and printing to tape. This is something that can easily be taught and reinforced in one day, leaving a week to fully engage with essential discipline-based concepts like: audience, message, and point-of-view. Anyone with a fascination for transitions or special effects has gained a conceptual background from the introductory workshop and can acquire these additional computer skills independently.

Online Collaborative Inquiry

Looking together at student work, professional practice, or new information requires structure, flexibility, and facilitation. When collaborative conversations go online, there are actually two facilitators: the people involved in the discussion and the technological interface. Human interactions have to be exaggerated and formalized online because there is no natural reminder to listen, respond, and reply. Moreover, very few conferencing systems build interfaces that reflect the shift in thinking from teacher as knowledge-conveyer to teacher as facilitator. Threaded discussion interfaces that allow a user to see a conversation in its entirety, instead of clicking through individual posts, reinforces the concept of collaboration. Allaire Forums is the shareware conferencing system that the WEB Project selected to use and modify because it builds from an interface that allows users to see the conversation as a whole, shifting the discussion focus from "tell the teacher" to "talk with each other."

As our work progresses, we have identified three different types of conversations whose interfaces, protocols, and purposes differ distinctly: design conversations, online dialog, and information exchange. Once articulated, being conscious about whether an interaction is based in creating, discussing, or exchanging, guides the planning and implementation of initiatives.

Design conversations focus on creating something new --a piece of music, artwork, a survey instrument, the plans for a multimedia production.... Collaborative discussion gives the creator a chance to receive multiple insights while the shared focus on a single piece of work broadens learning for the entire group. When conflicting viewpoints are represented, it also provides an opportunity for the creator to make informed decisions based on personal intent. A collaborative design discussion often leads to results that would have otherwise been unimagined.

Online dialog can be helpful to use when planning an event, analyzing data, discussing points of view, or troubleshooting. When specific goals require online discourse to be focused and timely, then establishing protocol-based discussions with specific rules, moves the conversation along. There are also times when free-flow conversations about ideas continue at a leisurely pace due to the asynchronous nature of threaded discussions. In such cases, loose guidelines for free-flow conversation enhance the discourse.

There are times when our online discussion has been based in an Information Exchange, the need or desire to learn from primary source information of a contemporary or historic nature. Such an exchange provides the opportunity to share a local collection of skills, resources, or knowledge with others who do not have the opportunity to experience this first-hand. Information exchange has worked best for WEB Project initiatives when they are short-lived, focused and lead to the publication of something like a joint web-site. Multimedia files (images, audio, or short video clips) greatly enhance an information exchange.

Lessons Learned and Future Plans

The arts and literature components, the first models from our original work, have taken on lives of their own. They are presently self-sufficient and have a solid theoretical and practical base from which to improve. The history and social sciences portion of the work remains unfinished, but shows promise.

Thanks to the evaluation of our larger effort, we have established a set of conditions necessary for further development and success:

1. establishment of a concrete, meaningful projects that everyone can understand and is excited to participate in
2. discussions amongst community members, educators, students, and content experts that focus on work and improvement of work associated with the project
3. links to local, regional, state, and national agendas to create conditions that can lead to sustainability
4. continuing dialog with other groups trying similar ideas
5. plans that contain multiple layers of success (the project itself is worthwhile, has the potential to bring a community together, and can lead to larger ideas and models of thinking).

These conditions translate to our current projects, including:

Applied Learning Studios: By August 2002 we will publish a curriculum for the development of communication and problems solving skills in community-based learning environments for students in grades 7-12.

Putney Celebration 2003: Five schools, several community organizations, and many individual citizens from the town of Putney will collect oral histories and assemble artifacts that represent the last 50 years. These primary materials will be used to update the town history, prepare digital information, and present works of art and theater.

Radio Victoria/El Salvadoran Youth Radio: In November 2001, the WEB Project begins Phase I of a partnership with youth in El Salvador who have created community radio stations. Presently, we are sharing information about digital video editing so that they can demonstrate their stations in action to potential funders. Eventually, we hope to explore Internet radio applications together.