A Mentoring Model for Interactive Online Learning in Support of a Technology Innovation Challenge Grant

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Abstract

The Lewis & Clark Rediscovery Project is a technology professional development program designed to help teachers restructure teaching and learning practices in the classroom, and to foster technology use in the schools. The 5-year program (extended into a 6th) was funded in 1999 with a grant from the U.S. Department of Education: Technology Innovation Challenge Grant. The Rediscovery Project's "touchstones" include the historic record of challenges and encounters of Lewis and Clark and the Corps of Discovery on their epic expedition, community studies highlighting 200 years of change along the Lewis and Clark Trail, and the development of technology-infused inquiry in teaching and learning. The program immersed 51 lead participant K–12 teachers in eight states along the Lewis and Clark Trail in activities designed to increase technology efficacy and facilitate the infusion of inquiry-based learning projects into their own classrooms. The participants are Lewis & Clark Rediscovery Project fellows who were successfully mentored through online courses and in summer workshops. Fundamental to the success of the project was the development of a model to mentor teachers in the field and to help facilitate outreach and peer mentoring of technology infusion across many districts. We have included in this review a description of the major Rediscovery professional development model strategies and activities, as well as lessons learned and emerging trends and movements in interactive online teaching and learning. (Keywords: Mentoring, professional development, online teaching and learning, sustained professional development, technology innovation challenge, Lewis and Clark)

Introduction

The Lewis & Clark Rediscovery Project model is an enhanced Train the Trainer (TTT) professional development strategy with sustained mentoring in technology skills development, technology infusion strategies, and teacher leadership over 5 years. The project participants were K–12 teachers selected from 17 school districts in eight states along the Lewis and Clark Trail, including West Virginia, Missouri, Iowa, South Dakota, Montana, Idaho, Oregon, and Washington. District administrators selected mentored participant teachers to be "Lewis & Clark Rediscovery Project (LCRP) fellows" working in their school districts to implement modeled strategies and activities. These LCRP Fellows shared access to mentors for help with technical issues, skill development, planning for technology infusion, and leadership in conducting local inservice workshops. This enhanced model was designed to go beyond the typical TTT strategy by ensuring a solid foundation in technology over an extended period with continuous access to mentors. As a part of the LCRP program, the participants received a stipend of approximately $800 for each academic term. At the project's initiation workshop, each district team of LCRP Fellows received technology including hardware and software, such as digital cameras, digital imaging software, QuickTime Virtual Reality (QTVR) authoring software, and geographic information systems (GIS) software. Participants were able to purchase additional technology hardware and software in the latter stages of the program through funding provided by the LCRP Leadership office in support of local professional development programs developed by the LCRP Fellows.

The Lewis and Clark Rediscovery Project focuses on teacher efficacy and the impact of the project on leadership development among participants. This manuscript discusses the Rediscovery Project and reports findings from the LCRP project. Findings have proven significant enough to warrant publication of the professional development model as well as its design and accomplishments. Through the ongoing program evaluation, the project collected data to assess the impact of the program relating to (a) teacher technology and technology teaching efficacy, (b) perceived barriers to technology infusion, (c) peer mentoring and leadership, and (d) classroom practice/pedagogy. Central to the project was the question: "What are the effects of a long-term, sustained mentoring program on technology teaching efficacy, perceived barriers to technology infusion, peer mentoring and leadership, and classroom practice/pedagogy?"

Review of the Literature and Theoretical Framework

Typically, Train the Trainer models fail to achieve their intended result of preparing skilled, well-versed, and highly efficacious trainees/trainers who are able to sustain effective outreach activities and mentor their peers. Failure is largely due to the "here today, gone tomorrow" aspect of typical TTT models, where mentors do not remain engaged with the participants as they progress in applying their new knowledge and expertise and continue to grow as leaders (Riel & Fulton, 2001; Murphy, 2000; Kennedy, 1999; Haslam, 1997; Hord, 1994).

According to A Nation at Risk (National Commission on Excellence in Education, 1983), a third wave of school reform (systemic change) has emerged following earlier waves of teacher enhancements (salary increases, content knowledge in core subjects, and an expanded academic year) and teaching conditions (professional development and teacher retention) (Church, 2000). A Nation at Risk continues to influence U.S. education with professional and staff development efforts focusing on leadership, quality of instruction, and accountability. Sparks and Loucks-Horsley (1989) found six principles of effective practice relating to professional development:

1. Programs conducted in school settings and linked to school-wide efforts
2. Teachers participating as peer helpers and as co-planners of inservice activities

3. Emphasis on self-instruction, with differentiated training opportunities
4. Teachers in active roles, choosing goals and activities for themselves
5. Emphasis on demonstration, supervised trials, feedback, and training that is concrete and ongoing
6. Ongoing assistance and support available on request (p. 2)

Killion (2002) reports that staff development alone will not produce results in student achievement. To produce greater results, professional learning must be embedded into a system of comprehensive renewal. Such renewal must include rigorous content standards, assessment programs that inform teaching and measure student progress, and policy changes that support quality teaching and leadership that advocates for high-quality professional learning and communities of learning. Killion's research suggests that students whose teachers receive professional development score better on assessments than students whose teachers did not receive professional development. These trends in increased student achievement occurred among teachers who received professional development in higher-order thinking skills, laboratory skills, content knowledge, and hands-on learning.

In a study comparing professional development models for teachers of mathematics and science, Tytler and Brown (1999) found no clear agreement in the literature in favor of any particular professional development model. However, they were able to identify well-established principles that could be used to guide effective professional development in whatever model is used. They conclude that programs need to be sensitive to the multidimensional nature of teacher development and to the context in which it occurs.

There are many approaches to, or models of, professional development, and some are better suited to specific outcomes than others (Gall & Vojtek, 1994; Trevor, 2003; Poplin, 2003; Sparks & Loucks-Horsley, 1989). It is essential that providers of professional development select the best strategies based on the intended outcomes, taking into account participants' prior knowledge and experience. Killion (1999) indicates that results must be measured in terms of student performance, the program must be well-defined with content-specific staff development designed to improve teachers' content knowledge and/or content-specific pedagogical skills, and the program should occur at multiple schools or within district, state, or regional areas.

Face-to-Face Training, Train the Trainer

The Train the Trainer models are often delivered face to face. Trevor (2003) notes that the positive aspect of some of the Train the Trainer models is that the utilization of expertise within a department to explore the applications of a particular technology to a particular subject can be highly effective, as all participants will share common needs. Although there are well-known models of effective teacher training, Corcoran (1995) is critical of the length of many face-to-face training models offered by school districts, citing that "teachers spend a few hours at best" in training sessions and that the experience involves a general lack of follow-up. Corcoran (1995, p. 16) notes, "There is a growing body of opinion among experts that the conventional forms of professional development are virtually a waste of time." Shaw (2003) explains that when these types of presentations fail, it is often because they are too bogged down in details and do not spend time promoting the big picture. Sparks and Loucks-Horsley (1989) describe the research and evaluation evidence regarding the impact of training on teacher knowledge and skills as not substantial; research does support many of the ingredients contained within these processes.

Professional Training

Sparks and Loucks-Horsley (1989) indicate that there is a much more substantial research literature on training than on other models of professional development. Under the appropriate conditions, training has the potential to significantly change teachers' beliefs, knowledge, and behavior, as well as their students' performance. Killion (1999) lists 26 development programs and how they show increases in middle level student achievement through teacher learning in language arts, mathematics, science, social studies, and interdisciplinary education. Killion (2002) goes on to describe what worked in elementary and high schools with regard to staff development.

In another form of professional development, Shaw (2003, p. 7) describes topical seminars as: "using the carrot as opposed to the stick to attract teachers who are enthusiastic about using technology in their classes." For example, the Preparing Teachers to Use Technology programs (PT3) focus on this strategy. However, this type of training may fall short in training teachers how to apply technology to their teaching. It is likely many teachers will miss the dialogue with an instructor and the ability to ask more complex questions (Trevor, 2003).

Mentoring

Mentoring programs provide the necessary guidance and support in content and/or pedagogy, to aid novice teachers in their ongoing professional development. Mentors can be colleagues in more advanced positions within a district, university professors, or other educational consultants providing outside, research-based perspectives. The Lewis and Clark Rediscovery Project mentoring model included all three mentor roles. "A fresh perspective is always a useful tool, and visiting another institution to see one's counterparts in action is a good way to get one." (Shaw, 2003, p. 11) For example, a language arts and a social studies teacher who wanted to understand more about implementing a Teaching Traditional American history program might arrange a visit to a school that had such a program. Sparks and Loucks-Horsley (1989) provide research showing that teacher behaviors can be influenced positively by the use of an observation/assessment model of staff development. It still remains to be seen whether this mentoring model must be combined with particular kinds of training to enhance student learning.

Online Training and Mentoring

The rise of the Internet over the last decade has shifted conventional training and mentoring to use new approaches where the Internet plays a key role. Online training and mentoring is increasingly an integral part of professional development that is reshaping traditional learning. Damoence's (2003) review of the literature illustrates that the Internet offers many possible resources that can enhance and support traditional teaching instruction and delivery. Damoence (2003) further suggested that learning that focuses on collaboration between the instructor and learners may ultimately increase interactivity and provide an authentic environment for learning. In addition, the social phenomenon of community may be put to good use through sustained online mentoring supported by theories of learning that highlight the role of social interaction in the construction of knowledge (Brook and Oliver, 2003, p. 37).

Swan, Holmes, Vargas, and Jennings (2000) describe the development of a model for integrating computer technology into classroom teaching and learning. The model adopted a mentoring approach that placed technology experts in schools to work with teachers to create technology-supported lessons that met the teachers' curricular needs. Rossi, Mullick, and Bauder (2000) describe successes in integrating face-to-face workshops with Internet modules focused on Internet search strategies, Web page design, and instant messaging. In addition to teaching these skills to teachers, the Web design module also included a session with students and teachers so that teaching strategies could be modeled. The teacher participants reported increased interest in using Internet tools in the classroom and greater comfort levels with the training strategy, materials provided by the instructors, and the modeling of techniques (Rossi, Mullick, and Bauder, 2000, p. 575).

Some of the key elements in these professional development models can be synthesized into three categories:

- Face-to-face/Train the Trainer
- Professional training
- Mentoring

The LCRP professional development model is different from typical TTT models because of the extensive and continuous involvement of mentors and their interaction with participants (online and face to face) throughout their growth and development.

Overview of the Lewis and Clark Rediscovery Project Activities

Summer Workshops

The Rediscovery professional development model consists of face-to-face interactions and distance mentoring via online interactions. Face-to-face interactions consist of summer institutes and mentor site visits. Summer TTT institutes address the following goals:

- Establish a base of local/regional Lewis and Clark content
- Develop technology skills in digital imaging and photography, QTVR authoring, and Web page development
- Strategic planning of the LCRP project

To accomplish these goals, LCRP facilitator-mentors engaged the Rediscovery Fellows in explorations of a wide variety of authoritative Lewis and Clark historical literature, including reviews of primary sources such as Gary Moulton's (1996–1999) 13-volume definitive edition of the original Journals of the Lewis and Clark Expedition. Additional resources included numerous biographies of members of the Corps of Discovery, as well as historical and modern-day maps and descriptive works on the landscape, geology, biology, water resources, and cultural settings from the past and present. The program held annual institutes at one of the four locations along the historic trail and always included a local tour of relevant Lewis and Clark sites. It encouraged fellows to work collaboratively to develop their own Lewis and Clark historical knowledge as well as to engage in planning of themed classroom units focusing on the Lewis and Clark expedition. Peer fellows reviewed these lessons and critiqued them for inclusion of inquiry-based learning, technology integration, and media-rich experiences. At each institute LCRP mentor-facilitators provided numerous breakout sessions for direct instruction and training in specific LCRP hardware and software technologies, including digital cameras and digital imaging software, QTVRsoftware, concept mapping software, GPS hardware, and GIS applications. Throughout the course of the 5-year project, a variety of additional technologies were introduced either by LCRP mentors (probeware and voice recorders) or by the fellows themselves (Smart boards and other classroom technologies).

Furthermore, each institute included experiential, guided-inquiry sessions in which we modeled technology infusion in a thematic study of the local/regional Lewis and Clark landscape and significant historical events. These modeled lessons engaged the Rediscovery Fellows in the type of community and inquiry-based educational experiences that would result in further Lewis and Clark content knowledge, connections to community, and direct experience in relevant and appropriate use of technology in learning. Among the technology integrated into these sessions were digital cameras and software for creating QTVRmovies, GIS software to develop maps of the local Lewis and Clark sites, and the development of Web pages to display the QTVR, maps, and other digital imagery collected by the participants. Institutes concluded with focus sessions for local LCRP team curriculum development. Throughout the institutes, LCRP teams shared strategies and lessons under development and provided friendly critiques of each others developing plans.

Site Visit Mentoring

Much like the professional development model that Swan, Holmes, Vargas, and Jennings (2000) describe, the LCRP model included ongoing mentoring from project staff and consultants. Mentor site visits required facilitators to visit remote districts to see LCRP fellows in their local setting. Mentors' site visits were scheduled a minimum of two times during the year between each summer institute (usually once in the fall academic term and again in the spring). To facilitate more frequent site visits and limit travel expense, mentors were selected from the LCRP project leadership partners and assigned to school districts based on proximity, availability, geographical region, and pre-existing relationships with LCRP facilitators. For example, two school districts in the eastern United States were mentored by a LCRP project staff member who was also located in the eastern United States and had expertise relevant to the teachers from those districts. School districts that were located in the Pacific Northwest were most commonly assigned a mentor who was located in Idaho or Montana. Although each district was assigned a primary mentor, multiple LCRP facilitators attended many local events such as professional development workshops to provide additional support to the local fellows.

These visits accomplished a variety of objectives. Mentors and LCRP fellows had the opportunity to discuss the progress of skills development and strategic planning, as well as work to overcome any lingering barriers to understanding the best uses of hardware and software. Also, during site visits, facilitators introduced upgrades or changes to existing software or hardware. Mentors also assisted LCRP fellows with planning and conducting local inservice professional development sessions, budgeting, and purchasing, and they collaborated to review LCRP fellows' exemplar lessons. Mentors also participated in meetings with local administrators, curriculum planners, and technology directors to assist the LCRP fellows in implementing local LCRP initiatives, such as professional development workshops.

The Rediscovery Project Leadership Partner Institutions, University of Idaho (UIdaho), University of Montana (UMT), and Wheeling Jesuit University (WJU), provided facilitator-mentors. LCRP leadership mentors conducted regional and local site visits each semester and provided follow-up support via chat, e-mail, and online discussion forums, in addition to specific technology training and guidance in infusion of technology in topical studies through online courses, each semester over a 3-year time period.

Below is a list of the mentors' charges, including the number of mentors involved and the district consortia they served:

- Ohio River Region 1: WJU curriculum and instruction lead (2), school districts mentored in Moundsville, West Virginia
- Missouri River Region 2: UIdaho C&I and ed tech lead (1), school districts mentored in St. Charles, Missouri
- Missouri River Region 3: UIdaho C&I and ed tech Lead (1), school districts mentored in Council Bluffs, Iowa
- Missouri River Region 4: LCRP project director and consultant C&I and ed tech lead (2), school districts mentored in Lower Brule and Eagle Butte, South Dakota
- Missouri River Region 5: UMT C&I and ed tech lead (1), school districts mentored in Cutbank, Conrad, Denton, Ft. Benton, Fairfield, and Valier, Montana
- Columbia/Snake/Clearwater River Region 6: LCRP project director and UIdaho C&I and ed tech lead (4), school districts mentored in Kamiah, Orofino, Lapwai, Lewsiton, Moscow, Potlatch, Idaho
- Columbia/Snake River Region 7: UIdaho C&I and ed tech lead (2), school districts mentored in Kennewick, Washington

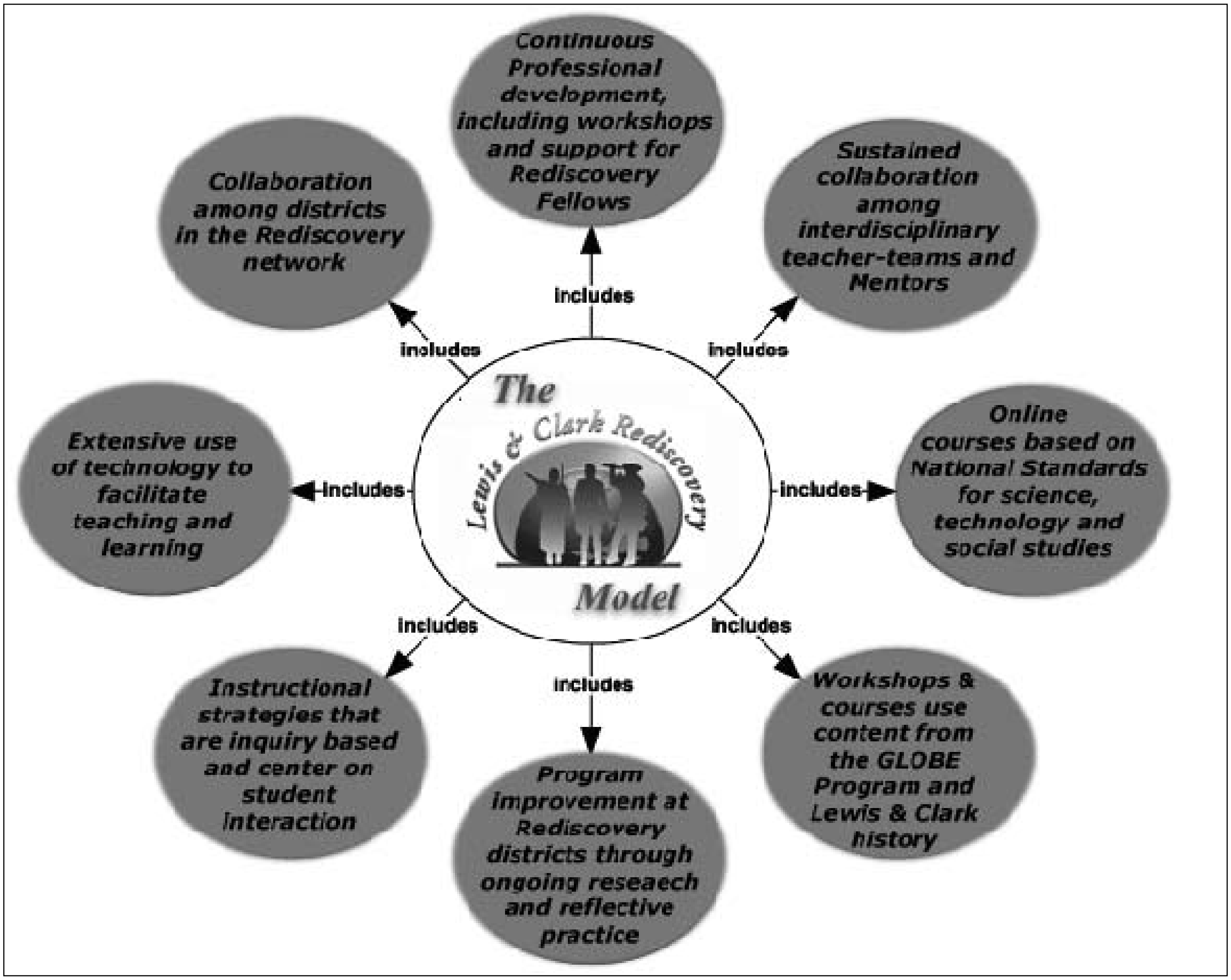

Figure 1: NOVA Project Model and Adapted Rediscovery Model Venn Diagrams

- Columbia River Region 8: UIdaho C&I and ed tech lead (2), school districts mentored in Portland, Oregon
- Columbia River Region 9: UIdaho C&I and ed tech lead (2), school districts mentored in Astoria, Oregon

Each of the nine LCRP Regional Consortia (listed above) had three lead teacher-mentees, typically including one representative from each of the following disciplines and grade levels: (a) high school biology or the natural Sciences, (b) middle school social studies, history, mathematics, or arts, and (c) elementary school generalist. Each of the nine regional consortia of LCRP fellows were tasked with conducting a minimum of three workshops over 2 years, plus locally held summer institutes. Annually, each district consortia drafted and submitted proposals for additional technology tools, materials, and supplies to conduct their local workshops and train their peers in technology infusion. Each year, Rediscovery fellows comprising a local LCRP consortia conducted their own workshops (with assistance from one or more regional LCRP leadership mentors if requested) and provided evaluation information on the strengths and challenges for each workshop, revising and enhancing as each workshop progressed. The LCRP leadership funded and provided oversight of these local workshop plans after critical reviews of their design and implementation strategy. These local workshops provided training and infusion strategies, as well as equipment and supplies for up to 30 additional teachers per workshop.

Based on year-end reporting to the U.S. Department of Education, for each of the 5 years of the Rediscovery Project's activity, professional development workshops and local mentoring of peer teachers directly affected 350 teachers. Further, more than 3,500 students per year were involved in technology-infused activities that local teachers designed and implemented as a direct result of their participation in Rediscovery peer training and mentoring.

Over the course of the project, the total number of teachers directly affected, either through participation in workshops or by having access to additional equipment, supplies, and help from LCRP fellows, was well in excess of 1,000, and the number of students directly affected totaled more than 10,000. The total impact of the Lewis and Clark Rediscovery Project is difficult to estimate precisely, as LCRP fellows continue to provide critical leadership in their districts even 5 years after the project's completion. It is fair to estimate that the number of teachers and learners affected was well over 40,000.

The authors anticipate conducting another follow-up study to investigate the lasting legacy of the project and the extent to which critical leadership within partner districts, as well as the style and substance of the peer mentoring they provide, can be tied to the original goals of the Rediscovery Project.

Online Mentoring Strategies

At the center of the online mentoring aspect of LCRP is the focus on electronic collaboration throughout the 5-year project cycle. Over this time, LCRP fellows received mentoring through online courses to support continuous development in technology skills, content knowledge relating to multiple disciplines, and the pedagogical implications for integrating technology into teaching. The purpose of this style of mentoring and facilitation was to create "change agents" within the K–12 system and to promote peer mentoring and a collegial atmosphere of mutual professional development.

The agents of change were the LCRP participants. In the LCRP professional development model, as participants gain new skills, experiences, and opportunities to lead their peers in technology inclusion, it was anticipated that they would lead their districts toward higher degrees of systematic technology infusion in an enhanced curriculum. In much the same way that Rossi, Mullick, and Bauder (2000) found success by modeling the effective use of technology, the LCRP model was designed to allow participants to use the same tools (e.g., online discussion boards, face-to-face workshops, etc.) within their own district in much the same way that they had used these tools in the LCRP project.

The Lewis & Clark Rediscovery Project Professional Development Model

The Lewis & Clark Rediscovery Project's Professional Development model was originally designed as an adaptation of the NOVA model. The NOVA Program (NASA's Opportunities for Visionary Academics [http://www.novaprogram.org]) mentors university faculty teams as they redesign college courses to include inquiry-based learning and infusion of technology. Both NOVA and LCRP professional development models sustain a continuous mentoring process for their participants throughout their development work. The NOVA professional development model integrates content with pedagogy through the collaboration of faculty from science, mathematics, engineering, and education to develop exemplary content courses for preservice teachers (NOVA Consortium, 2002). The NOVA model includes the following eight major elements:

- Continuous professional development in workshops and support for project partners
- Sustained collaboration among interdisciplinary teams of faculty and administrators
- Courses based on national standards for science, math, and technology
- Course content utilizing NASA Strategic Enterprises
- Program improvement at NOVA institutions through ongoing research
- Instructional strategies that are inquiry based and center on student interaction
- Extensive use of technology to facilitate learning
- Collaborations among institutions in the NOVA network

Like NOVA, the Rediscovery Project professional development model integrates content and pedagogy through the collaboration of faculty from across K–12 disciplines with university teacher-educators to develop exemplary content for K–12 classrooms with significant and appropriate infusion of technologies. As an adaptation of the NOVA model, the Lewis & Clark Rediscovery Project professional development model retains eight major elements to a form appropriate for a K–12 audience (see Figure 1).

The Rediscovery Project model, like NOVA, focuses on facilitating change agents in educational systems and is an adaptation/expansion on the concept of a Train the Trainer model used in many inservice/professional development programs. The focus on change-agent facilitation is intended to develop an awareness of alternative pedagogic models of inquiry, involve learners as collaborative and cooperative groups, broaden inquiry across traditional disciplinary boundaries, create thematic units of study, and share information, knowledge, and learning strategies.

Through facilitation and mentoring of core teams of educational leaders (district lead teacher partners or LCRP fellows) and development of exemplar projects in districts across the nation, the Rediscovery professional development model encourages and demonstrates effective means of meeting state and national standards across disciplines while infusing technology in the process of moving educators toward more constructivist approaches to teaching. Rediscovery Fellows as change agents then serve as resources in their own districts, influence curriculum and technology coordination efforts, and encourage the infusion of technology in learner-centered, inquiry-focused activities developed and implemented by their peers. The Rediscovery model sustains the change-agent development process by mentoring participants continuously in face-to-face trainings, providing support for professional development workshops designed and conducted by LCRP fellows, conducting regular site visits, and providing continuous online courses for technology skill development, pedagogy, and project-related content.

Rediscovery, again like NOVA, increases the collaboration among the partner institutions by providing a forum to exchange innovative ideas for change in K–12 education. These forums take place in annual workshops and within online Rediscovery courses offered through the University of Idaho. The project Web site facilitated additional resource sharing through such features as a News section for teachers to share successful curriculum ideas and projects. Rediscovery mentors also assisted the program evaluators (Northwest Regional Educational Lab) and program personnel at the University of Idaho in conducting research on the effectiveness of the LCRP K–12 professional development model and the challenges and successes of the groups they were mentoring.

Rediscovery Institute /Annual Summer Workshops

Rediscovery Project face-to-face institutes and workshops took place in the summers (2000–2004) and onsite at partner district locales during the school year. LCRP fellows' professional development includes specific technology skills training as well as technology-infusion in classroom practice. Institute and workshop experiences allow the community of learners to work together, gain trust, and receive individualized, hands-on assistance from their mentors and their peers. Daily workshop review and feedback forums allow the fellows to critique and inform the project leadership regarding workshop logistics, planning, the relevance of activities, and ideas for refining the future workshop experiences. The participation of LCRP fellows in workshop site selection as well as planning group activities and focused break-out technology sessions ensured a high degree of personal ownership of the collaborative workshop experiences.

Project evaluators (Northwest Regional Educational Laboratory personnel) gathered survey information at the workshops and interviewed fellows. Feedback from evaluator efforts and from the fellows directly influenced the decisions of the LCRP leadership mentors in tailoring the technology training and workshop activities (Wang, Britsch, & McClure, 2000). Workshops concluded with a series of presentations or poster sessions in which district teams of LCRP fellows shared their emerging ideas for technology infusion, innovative classroom activities, and Lewis and Clark–related themes for student inquiry.

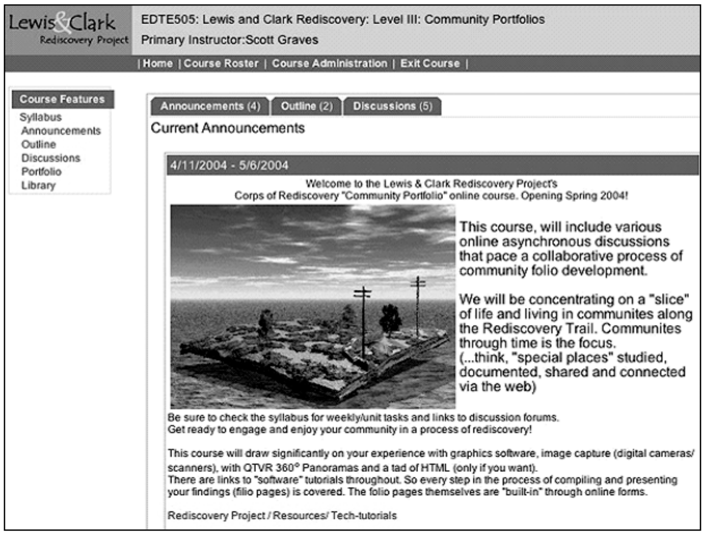

Figure 2: Screen Image, Rediscovery Project Online Course, Community Portfolios

From the first group meeting in January 2000 to the midproject summer workshop of 2003, participant fellows gained a strong understanding of the project's goals and objectives and began to bond tightly as a community of learners and technology leaders. The sequence of face-to-face workshops, online courses, and site visits, as well as the continuous availability of mentors, comprised a codification process for the project partners as a whole and for clarification and refinement of the role of fellows in outreach and trainer-trainee activities in their local districts (Wang, Britsch, & McClure, 2000). Online courses continued the mentoring process as participant fellows pursued additional skills development in the context of science, history, technology, or social studies content explorations.

Instructional Technology: Enhancing Professional Development with Online Courses

LCRP professional development during the school year focused on the use of Web technology and the use of Rediscovery Web products in education. The LCRP technology initiative encouraged the introduction of technologies into K–12 teaching and sought to greater change in the manner in which teachers plan for, and teach, students. Borrowing strategies and insights from the NOVA Program, the LCRP leadership and mentors recognized "that the design of an electronic environment for learning is quite different from a design for giving out information" (NOVA Consortium, 2002, p. 14).

In the design and development of an online learning system and course management framework, LCRP designers adhered to a learning community model. By incorporating technology in a meaningful way into LCRP online courses experiences, these courses reflected the manner in which technology enhances and integrates learner-centered, knowledge-centered, and assessment-centered instruction within a pluralistic community-centered teaching paradigm. For example, the LCRP used Internet technology in a variety of ways to foster the development of a community of learners. The use of asynchronous interactions in the form of threaded discussions, where participants' views are presented to the class as a whole, or in small study group and private discussion spaces, allowed participants the opportunity to examine ideas, comments and reflections, in a nonthreatening environment. The fact that LCRP fellows had previous face-to-face meetings helped to accelerate the growth and maturation of this community of learners. With each sequence of workshops, online course experiences, and site visits, participants assumed more responsibility for their learning. They also began to participate in developing the project agenda in terms of emerging interests and group consensus on additional classroom activities and technologies they wished to implement.

Structuring and delivering content knowledge is what most K–12 teachers and university faculty accomplish very well. However, effective integration of content with the other three (learner-, knowledge-, and assessment-centered) perspectives is not as common in many classroom experiences. Using technology to help structure and facilitate the integration of content knowledge with thoughtful and reflective assignments offers a significant enhancement to the learning structure (NOVA Consortium, 2003, p. 14).

The LCRP online course development team spent considerable time refining and evolving the LCRP online course offerings for project fellows. In some cases, they revised entire courses to better reflect the input of the participants. The overall process of course development, testing, and review was a collaborative process that involved input from developers, external project evaluators, and the project participants. The Rediscovery Project Web site (http://www.lcrediscovery.org/lcrp) has sample LCRP professional development Internet courses.

Rediscovery Online Courses

The LCRP online courses began with "Technology for Teachers," in which participants completed tutorials on specific technology skills that would be required throughout the LCRP program (digital imaging, QTVR authoring, etc.). These skills are assessed through performance assignments and augmented with concurrent readings and discussion forums regarding the pedagogical implications of these technologies.

A second course focused on local community history and the development of an online "Community Portfolio" using Web page authoring software, digital imaging, and immersive interactive panorama (QTVR) generation (see Figure 2).

Three other online courses included:

- Overviews of GIS and its use in developing community-based mapping and geography studies
- Remote Sensing and "ground-truthing" of satellite imagery using GLOBE Program field study protocols
- Teacher as Researcher, in which Rediscovery fellows explored the research on classroom practice in order to plan, implement, and reflect on an inquiry-based unit they initiate in their own classroom; includes significant discussions of qualitative research practices

All online courses feature threaded discussion forums where participants converse with their mentors on technology issues, seek and share help with ideas and technology implementation, and engage in spirited debate on district, regional, state, and national education issues.

Methods and Research Design

The methods employed by the LCRP model strategies included quantitative as well as qualitative aspects. The essential research and evaluation questions addressed in the investigation of the Lewis and Clark Rediscovery professional development model are as follows:

- What is the impact of the LCRP professional development efforts on self-efficacy in teaching with technology?
- To what extent do sustained mentoring efforts, including online mentoring, encourage participants to develop as technology innovation leaders in their schools?
- What is the impact of promoting a "change agent" approach to teacher leadership development in a sustained TTT model of professional development?

Description of the Participants

The LCRP project participants included 51 teachers, selected by their district administrators, from a wide variety of school settings. The participants represent a wide variety of school districts, including 5 urban school districts and 12 rural schools, with teachers from elementary, middle, and high school grade-levels represented, and all subject areas (science, mathematics, social studies, language, and the arts). Teacher experience ranged from 3 years to 35 years.

According to the data collected using baseline technology skills surveys at the beginning of the project, most participants were novice computer users and rated themselves as fairly experienced at word processing, spreadsheets, and record keeping, but few acknowledged any familiarity with computer graphics, Web page/presentation design, GIS or the other more advanced aspects of the Rediscovery Program tools (QuickTime panoramas, digital probes, and Palm Pilots). A small number of teachers (n = 5) entered the program with significant existing technology skills including troubleshooting knowledge, programming experience, and applications knowledge.

Data Sources

Data for this evaluative study included surveys administered at the beginning and end of the project as well as additional data collected via the program evaluation that was ongoing throughout the project. The program evaluation data included interviews, site visit reports, and case studies findings.

The researchers administered two survey instruments at the beginning of the program to assess technology knowledge and skills as well as perceived barriers to technology infusion. [They? We?] developed these surveys specifically for this project and provided an understanding of the participant starting points in technology skills and experience in curriculum integration.

At the end of the project, we used the Microcomputer Utilization in Teaching Efficacy Beliefs Instrument (Enochs & Riggs, 1993) to determine the impact of the program on self-efficacy beliefs regarding teaching with technology. The MUTEBI instrument includes two subscale measurements for Personal Self-Efficacy (SE) and Outcome Expectancy (OE). Personal Self-Efficacy is defined as "teachers' beliefs in their own ability to utilize the microcomputer for effective instruction."(p. 2) Outcome Expectancy is described as teachers' beliefs regarding their responsibility for students' ability or inability to use computer technology in the classroom. The MUTEBI's development and validation studies report reliability α scores of .77 for the subscale measure described as outcomes expectancy and .85 for self-efficacy (Enochs & Riggs, 1993; Albion, 2000). We administered the MUTEBI at the end of the project in both a posttest and a "retrospective pretest" form. In this manner, participants were asked to indicate their current level of agreement for each MUTEBI item as well as estimate their retrospective ratings prior to the beginning of the project.

The MUTEBI is designed as a Likert-scale self-assessment survey. Sample items in the MUTEBI questions (among others) include the following:

Outcomes Expectancy sample items:

- "When students' attitude toward using technology improves, it is often due to their teacher having used technology in more effective ways."
- "The inadequacy of a student's technology background can be overcome by good teaching."
- "Students' technology ability is directly related to their teacher's effectiveness in classroom technology use."

Personal Self-Efficacy sample items:

- "Even when I try very hard, I do not use technology as well as I do other instructional resources."
- "I understand technology capabilities well enough to be effective in using them in my classroom."
- "I wonder if I have the necessary skills to use technology for instruction."

We administered the MUTEBI as a postretrospective survey to avoid a potentially confounding aspect of self-assessment instruments: the response-shift bias noted by Bray, Maxwell, and Howard (1984), Howard (1980), and others.

To assess the impact of promoting a "change agent" approach to leadership development, this study focused on the case studies, interviews, and site visit reports compiled by the Northwest Regional Educational Lab (NWREL), which served as an outside and independent evaluator for the project. These NWREL evaluation reports, prepared by Dorfman and Wang (2004); Wang, Britsch, and McClure (2000); and McClure and Wang (2002a, 2002b), provided additional context, through which it was possible to examine the successes and challenges of implementing the LCRP professional development model. LCRP mentors prepared site visit reports during each of the visits to local school districts.

NWREL evaluators conducted other site visits in addition to the mentor site visits. NWREL evaluators also conducted interviews of the participants during the summer institutes and developed case studies of many of the participating school district teams. The evaluation reports were invaluable in the ongoing development of the LCRP program and serve to provide a detailed description of the impact of the professional development program.

Findings

During the course of the Rediscovery Project, a fairly high percentage of fellows who had not already completed a master's degree in teaching (18 of 51) chose to use LCRP content and professional development experience to apply for a master's of arts in teaching at the University of Idaho. Before the project's end, all of these teacher-participants had completed their coursework and thesis/project work. The Lewis and Clark Rediscovery Project, through its affiliation with the University of Idaho and the granting of graduate course credit, then offered these emerging local teacher-mentors additional academic and professional legitimacy to assume their change-agent status and further their district's goals of technology infusion and standards-based curriculum development. Throughout the Rediscovery Project, and particularly throughout the online course experiences, all Rediscovery fellows routinely communicated with their mentor-facilitators using e-mail. In these more private communiqués, participants received specific help, friendly critiques, and feedback on the process of their development.

From baseline surveys, interviews, site visits, and case study findings, it is clear that although many LCRP Fellows had computers in their classrooms and regularly used them for maintaining records and in their own lesson plan development, prior to LCRP, they by and large did not use them in classroom activities (NWREL, 2004).

What they lacked at the outset of the Rediscovery project was experience infusing technologies in inquiry and exposure to effective models for teaching with technology. Perceived barriers to infusion ranged from a lack of administrative support for technology innovation—or recognition of teacher needs for professional development in technology infusion—to a lack of building-level expertise in hardware and software issues, and a general absence of effective models for technology infusion. Interestingly, although participants rated these barriers consistently—and in many cases their rankings demonstrate these barriers persisted and even intensified

Table 1: Perceived Barriers to Technology Integration

Element	Perceived Barrier		Extent of Hindrance	
	2000	2002	2000	2002
District/state curricular constraint	26%	36%	2.94	1.64
Availability of appropriate software	60%	53%	4.91	1.41
Availability of appropriate hardware	55%	56%	5.06	1.40
Availability of technical support	55%	61%	4.67	1.62
Availability of models for integration	66%	38%	4.32	1.76
Personal comfort level with technology (technology proficiency)	43%	24%	4.13	1.73
Lack of overall technology planning in building	40%	27%	4.27	2.77
Lack of support from school administration	15%	23%	3.18	1.00

from the project beginning to the midpoint—the level of inhibition the teachers felt over time decreased.

Although barriers to effective technology infusion identified at the outset remained at the project's midpoint, significant changes in the perceived inhabitance to teaching emerged. Forty-three percent of teacher participants listed "personal comfort level with technology (technology proficiency)" as a barrier to integration at the project beginning. By project midpoint, just 24% of teachers felt this way. "Availability of technology" was a barrier for 66% of participants at the beginning of the project. Midproject, only 38% of participants reported this access issue.

When we asked the participants to rate the "extent of hindrance" for each of the major perceived barriers (on a scale of 1 to 7, 1 indicating a minor barrier and 7 a huge barrier), a more interesting picture emerged. Although it appears that many perceived barriers remained in place, participants' rankings of the seriousness of these barriers significantly diminished. Table 1 shows the major perceived barriers to technology integration and the level of hindrance they presented to participant LCRP fellows for the beginning of the project and the midpoint.

Based on the survey results that the researchers analyzed and synthesized, which included information from site visits, informal interviews, classroom observations, and assessments of online course products that LCRP participants produced, 90% of participants demonstrated significant gains in technology skills development and more positive attitudes toward technology. The analysis of results from the MUTEBI showed minimal gains in teacher technology efficacy gains. Table 2 shows the gains in outcome expectancy and personal teaching efficacy.

A matched-pairs t-test was conducted to evaluate the difference between outcome expectancy ratings prior to participation in the LCRP program (M1=15.35) and after the program (M2=22.65). The analysis indicated that the difference was significant, $t(42) = -12.353$, $p<.01$, indicating that outcome expectancy ratings following the LCRP were significantly higher than before the program. Likewise, we conducted a matched-pairs t-test to evaluate the difference between personal technology efficacy (PE) ratings prior to participation in the LCRP program (M1=26.88) and after the program (M2=49.12).

The analysis also indicated that the difference was significant, $t(42) = -12.653$, $p<.01$, indicating that personal technology efficacy (PE) ratings following the LCRP were significantly higher than before the program.

Analysis of additional survey items, including attitudes toward technology and specific tech-knowledge and skills gains, along with an in-depth analysis of case study findings, yield a clearer picture of quantifiable changes in participant affective domain and knowledge-skills domains.

Qualitative studies. Together, the case study findings and the MUTEBI results both demonstrate and infer gains in participant knowledge and skill levels, as well as gains in their confidence in teaching with technology, and in particular in mentoring fellow teachers in effective and appropriate use of technology in the classroom. Clearly some participants were novices at the beginning of the project, and many technologies included in Rediscovery were new to them, yet some were rather expert. All, however, had little expertise in infusion in learning scenarios, and many reported being uncomfortable teaching their peers how to either use technologies for their own purposes or in classroom activities.

By midproject, virtually all LCRP fellows had gained the skills and confidence necessary to use and infuse technology in their teaching, and to effectively coach and train their peers (Dorfman & Wang, 2004). They also had overcome the lack of effective modeling of technology infusion and were demonstrating innovative uses and student uses of technology embedded in inquiry projects. As they began to host their own technology training sessions with peer educators, they gained more and more confidence in their knowledge and skills as peer mentors. Local district peer teachers who had been trained in local workshops offered by LCRP fellows reported in surveys that they both appreciated and learned from the efforts put forth by the LCRP fellows. Many peer teachers report that observing a fellow teacher effectively model technology infusion, and having that expertise available and nearby in the local district, gave them confidence to employ the strategies learned in LCRP local workshops. Dorfman and Wang (2004), both NWREL project external evaluators, state in their Lewis and Clark Rediscovery Project, Summary of the Year-end Reports, 2003–2004 Program Year:

> When asked about success stories related to the inservice training teachers received, the majority of sites told us that increased use of technology by teachers and students was one of their biggest successes. Several other sites reported that the teacher trainings and mentoring have contributed to some of the most positive aspects of their professional development over the past 5 years. Orofino School District said that having the familiar faces of their teachers provide training helped greatly with those who had phobias about technology. Teachers were proud to report that their new skills and knowledge were valued by their colleagues, and they were asked to present locally and at district workshops and national conferences. Some reported expanding on their Lewis and Clark Rediscovery Project training with further graduate study and completion of advanced degrees. Several schools found great success in motivating their students not only to learn, but to take innovative and creative approaches to their class work.

Rediscovery Fellows also reported significant student engagement and positive attitudes toward cooperative work using technology for problem solving and learning (Dorfman & Wang, 2004). As LCRP Fellows developed, tested, and refined their own model technology infusion scenarios, they began presenting at regional, state, and national/

Table 2: MUTEBI Results: Personal Technology Teaching Efficacy (PE) and Outcomes Expectancy (OE)

Paired Samples Test		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		*t*	*df*	Significance (2-tailed)
					Lower	Upper			
Pair 1	q_OE - rq_OE	-7.302	3.876	.591	-8.495	-6.109	-12.353	42	.000
Pair 2	q_PE - rq_PE	-22.233	11.522	1.757	-25.778	-18.687	-12.653	42	.000

international conferences. LCRP Fellows and their projects have been highlighted in the media on PBS television programs, on the Internet at Intel's Innovation Odyssey Web site (Intel's Innovation Odyssey, 2003a, 2003b) and Palm Web sites (Palm One, 2003), and in magazines such as Northwest Education Magazine (NWREL, 2003) and Connect (Connect, 2003).

Implications and Applications to Practice

Challenges and Successes in Mentoring LCRP Fellows

Rediscovery Project local programs. Each LCRP partner district submitted annual proposals for local programs to be run during the school year. A budget of $9,000/district was available to Rediscovery fellows for use in developing innovative technology-infused, standards-based, and inquiry-focused classroom activities and peer-mentoring workshops to disseminate LCRP model activities. LCRP fellows received training in successful grant-writing strategies, and a request for proposal (RFP) for annual programs funding was distributed in the 3rd, 4th and 5th years, with the district mentor-facilitators serving as guides and assistants in implementing workshop outreach and annual reporting of district activities year to year. In years 1 and 2, the project leadership encouraged all teachers to use the funds available to ensure that they had access to computers in their classrooms and mobile computing platforms (laptops) for use at home, in workshops, and at annual LCRP Institutes. The district outreach components for years 3, 4, and 5 were meant to complement and expand the inservice workshops and accomplish the end goal of train-the-trainer outcomes. LCRP funds devoted to local project development supported the creation of many new opportunities for fellows and local peer teachers to use technologies directly in their teaching. Many teachers took the extra steps in planning necessary to get the technologies directly in the hands of their students.

Digital community portfolios. Rediscovery fellows created a digital community portfolio of their local area for the Community Portfolios online course. Fellows worked in teams of three, taking alternative perspectives of "naturalist," "historian," and "geographer." During the following school year, they refined and focused their community portfolios and made them available on local school Web sites. The portfolios focused on the past, present, and future of each school and community and incorporated the use of digital cameras and imaging software (Photoshop), 360o panorama-rendering software (QTRV), concept mapping software (Inspiration), HTML/Web authoring software (Netscape Composer or Front Page), and GIS mapping software (ESRI ArcView). Rediscovery participant district portfolios are linked at the Rediscovery Web site (http://www.lcrediscovery.org/lcrp/resources.html).

A Community Portfolio course-culminating activity included the design of specific strategies for translating LCRP fellows' personal portfolio-building experience into a thematic lesson for their classroom. Rediscovery Project fellows and many of their local district peers who had participated in workshops and LCRP online course offerings then used their Community Portfolios for classroom projects with their students.

Rediscovery Corps Quests. Corps Quests are an adaptation of Bernie Dodge's Web Quest instructional strategy developed at San Diego State University (http://webquest.sdsu.edu). As a part of their Local Programs development tasks, LCRP fellows each produced one or more Corps Quests as exemplar technology-infused inquiry lessons. These were peer reviewed and critiqued by mentor-facilitators as a part of the online course experiences. Later, as part of each district's online portfolio, the Corp Quests were linked, along with references to standards. LCRP Corps Quests are linked to the portfolios on the Rediscovery Web site (http://www.lcrediscovery.org/lcrp/resources.html). The fellows, along with many of their locally trained peer teachers, have used these Corps Quests (and others they continue to develop) directly with their classroom students. The fellows report that the Corps Quest strategy is highly engaging for their students and frees them from the role of instructional content deliverer to focus on facilitation as an expert guide in a more learner-centered inquiry experience.

Site visits and local district inservice workshops (TTT outcomes). Site visits and local district inservice workshops gave Rediscovery fellows and their mentor-facilitators ample opportunities to review progress, share and critique ideas and technology-infusion plans, and refine and implement local technology skills and tech-infusion workshops delivered to peer teachers.

Each of the 17 local districts held inservice workshops each semester of project years 3, 4, and 5. These workshops became an integral part of each district's annual outreach/dissemination TTT activities. Each inservice workshop was intended to serve 20–30 teachers and covered basic LCRP technologies with skills-development activities and follow-up technology-infusion strategies. For local district peer teachers trained by LCRP fellows, the University of Idaho offered graduate credits or continuing education credits upon workshop completion and follow-up submission of reflective practitioner assignments. Local inservice workshops ranged from 3- to 6-week sessions delivered on varying schedules, worked out among LCRP fellows and their mentor-facilitators in conjunction with local district curriculum and technology personnel. Expected outcomes for each workshop included demonstrated proficiency in technology skills, along with sample technology infusion lessons to be test-implemented in classrooms, reviewed, and revised.

Each team of Rediscovery fellows was required, as a condition for approval of proposed workshop descriptions and budgets, to document their challenges and successes in conducting their workshops. They submitted these postworkshop reports to the project leadership and the external evaluators. Fellows reported that their workshops were universally well received. Through evaluations conducted by the Northwest Regional Educational Lab, teachers trained by LCRP fellows report that having a trusted peer teacher who has spent time in developing their skills and exploring strategies for infusion in meaningful learning that they can relate to (locally relevant and teacher-produced) has eased and accelerated their own embrace of technology (Dorfman & Wang, 2004). Many local LCRP trainer teachers are now sharing their lessons and classroom experiences within their buildings, across district schools, and among regional LCRP partners.

Discussion

Successful Rediscovery Mentee Development—Highlights from Two Case Studies

Montana LCRP fellows. Montana Rediscovery fellows all are members of the Golden Triangle Curriculum Consortium, a collection of cooperating, small, rural districts in central Montana. Covering an area of more than 50,000 square miles, the consortium is composed of more than 700 teachers and 10,000 students. The Montana LCRP fellows developed specific consortium-wide technology professional development strategies under the motto, "Learn to use, then use to learn." They made exemplary use of communications and Internet technologies from the start by using e-mail, listservs, and live chat rooms to could meet and strategize in real time.

The Montana fellows were so successful in their change-agent roles that one fellow moved from a position as a classroom teacher of music to the consortium's technology director and coordinator of workshops. In that new role, she was able to adapt the original Lewis and Clark Rediscovery grant proposal to suit their needs and won funding for additional statewide technology professional development.

Montana Rediscovery fellows received much acclaim in their region, have been recognized by their political leaders, and have presented nationally at educator conferences. The Golden Triangle LCRP fellows were showcased on a National Teacher Training Telecast in 2003 (PT3 Now!, 2003). Montana LCRP fellows fledged as powerful agents for change and peer mentors, extending LCRP strategies in many of their consortium's new projects.

Lewiston, Idaho, LCRP fellows. The Lewiston, Idaho, LCRP fellows began as many fellow groups did, with widely varying skills and technology knowledge but little experience in peer mentoring and in driving technology innovations within their district. The Lewiston schools were fairly well equipped with technologies from the start but had not afforded significant time for professional development in technology infusion.

One of the Lewiston Rediscovery fellows was rather reluctant to embrace much technology at the beginning and was nearing retirement. Despite this, he made tremendous headway in overcoming personal technology efficacy barriers and became a great resource for digital imaging expertise.

Another outstanding success was attained by the district's Gifted and Talented teacher, who, although already fairly tech-savvy, made a significant leap in developing skills and knowledge of the most difficult technology introduced in the Rediscovery Project, GIS. Working with a small cadre of junior high school students, this fellow began applying GIS in inquiry projects centering on the community and soon built a reputation for an innovative project involving mapping the history and development of the town cemetery. Their project evolved into a multiyear endeavor that involved acquiring high-resolution satellite imagery from NASA and sophisticated ground-penetrating radar equipment for imaging the subsurface geology. The ongoing Rediscovery GIS project won international acclaim at the ERSI International GIS Users conference in 2003 (ESRI, 2003), and the young students gained significantly from the very real application of advanced technology in service to their community. This team of LCRP students has been nominated for numerous awards, including recognition from the American Association for State and Local History and the Orchid Award for Historical Preservation.

Conclusions, Implications, and Indications of a Successful Professional Development Model

All of the Lewis and Clark Rediscovery Project teams (local district fellows) continue to concentrate their efforts on training fellow teachers with long-term skills that will serve them well once the LCRP grant expires and the team members retire from the public schools. The project has placed special emphasis on training key staff members at each district school, particularly those whose teaching careers will extend into the next decade. Even though specific technologies will inevitably change and improve, basic problem-solving techniques will continue to provide teachers with the ability to adapt.

The Rediscovery fellow teams have made concerted efforts to saturate their district schools with pertinent and sustainable technologies that will have an effective use after the life of the Lewis and Clark Rediscovery Project. As mentioned earlier, under the site visit mentoring, the total number of teachers directly affected from 1999 to 2004 was more than 1,000, and more than 10,000 students were engaged. Their growth and development as peer trainers and change agents in their districts is a result of sustained mentoring from the project leadership as well as ongoing collaboration and communication among the member groups. All have noted the contribution of online mentoring strategies as among the most important aspects of the experience. The online courses, e-mail, listserv, and live chat sessions served to keep fellows focused and committed and sustained them through the many months between site visits and group workshop/institutes. Having a mentor or colleague who was always there for them and forthcoming with friendly critiques, advice, and help—both technical and pedagogical—appears to have been the key to their success. The specific inclusion of ongoing facilitation with online course experiences serving as follow-ups to institutes and workshops, the constant availability of mentors via telecommunications, the project Web site and discussion boards, and the significant duration of this unique train-the-trainer model have proved to be a valuable experience to all participants.

As the Lewis and Clark Rediscovery Project came to a close and grant funding ceased, the best of hard-won lessons in professional development, the network of online learners, and the enthusiasm for innovative long-term professional development will endure. At project completion, the project research team will finalize its quantitative and qualitative research findings and make them available in future conference proceedings and additional articles and publications. The main project Web site (http://www.lcrediscovery.org/lcrp) will remain a legacy online site for information regarding all project activities and findings.

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expedition. Special thanks are offered to the project evaluation team at the Northwest Regional Educational Laboratory for all their valuable formative and summative assessments, internal reviews, and critiques. Finally, this project was designed for and dedicated to the teachers and their students who live along our nation's great waterways of the Ohio, Mississippi, Missouri, and Columbia and their tributaries.

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Editor's Remarks continued from p. 2

~~consideration when assessing levels of technology integration by teachers. Their article, "Developing Higher-Order Thinking Skills through WebQuests," emphasizes the need to support classroom teachers' adoption of technology in ways that support the higher-order thinking skills that are essential for success in the 21st century. The final article is the SIG for Technology in Teacher Education Award-winning paper presented at the National Education Computing Conference (NECC) in Washington, D.C., this year. In this paper, Vivian Wright, Joy Burnham, Christopher Inman, and Heather Ogorchock explore the affordances of Second Life in educating adolescents about cyberbulling, a growing problem as teens spend increasingly large amounts of time in cyberspace. Findings help educators understand how students' experiences in informal learning environments may be used in engaging ways to meet the goals of formal schooling. Together these articles provide leaders in technology and teacher education with a growing research base to improve the practices and policies necessary to create schools that prepare students and teachers for the challenges of working and living in a digital world.~~

President's Message continued from p. 3

~~SIGTE Graduate Student Scholarships~~

~~A number of years ago, SIGTE began funding annual scholarships to support the work of graduate students as they begin their careers in the field of technology in teacher education. We have continued to increase funding for these scholarships, and this year all four winners presented their work in various sessions at NECC. These $500 scholarships were awarded to Linda Macaulay of Towson University, Shih-Ting Lee of the University of Texas at Austin, Jana Hare of the University of Kansas, and Kenneth Shelton of California State University in Los Angeles. More information about the scholarships is posted on the SIGTE wiki. Special thanks to Robert Jason Hancock, who chaired the committee that selected the scholarship winners for the past two years, and Treasurer Karen Grove, who has led this work since its inception.~~

~~As you read the list on page 42 of those who served SIGTE this year in a variety of capacities, please consider contacting me or any of our SIGTE officers listed at the SIGTE wiki if you want to get more involved. Thanks to everyone for all their hard work last year, and we look forward to more of the same in 2009–2010.~~

~~Resources~~

~~ISTE PT3 Books: http://www.oten.info/pt3insights.html~~

~~Rhine, S., Bailey, M., Eds. (2005). Integrated Technologies, Innovative Learning: Insights from the PT3 Program, Vol. 1. Eugene, OR: ISTE.~~

~~Rhine, S., Bailey, M., Eds. (2005). Integrated Technologies, Innovative Learning: Insights from the PT3 Program, Vol. 2. Eugene, OR: ISTE.~~

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~~NECC 2009 Web site: http://center.uoregon.edu/ISTE/NECC2009~~

~~SIGTE wiki: http://sigte.iste.wikispaces.net~~