



Building Learning Communities to Increase Faculty and Preservice Teacher Use of Technology

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Abstract

Effective learning communities connect members so that they can share knowledge and experience. This article examines the process and outcomes of building learning communities to increase faculty and preservice teacher use of technology through PT³ funding at three institutions: National-Louis University, the University of Houston, and the University of Vermont. Strategies implemented as well as achievements and challenges for each project are outlined. Recommendations include reinforcing common goals and mutual benefits, connecting distant community members through online communication, dynamic configurations for networking, and incentives for faculty participation. Successful learning communities require nurturing to reduce isolation through improved communication and active participation.

Substantial federal funding, in the form of Preparing Tomorrow's Teachers to Use Technology (PT³), has enabled colleges and universities around the country to make significant strides in educating future teachers who are prepared to integrate technology into K–12 classrooms. Successful efforts required faculty involved in teacher education programs to increase their own knowledge of appropriate K–12 uses of technology, their skills in using a variety of computer applications, and their repertoire of instructional strategies to model technology integration. To receive funding, each PT³ grantee was challenged to develop an innovative approach to preparing tomorrow's teachers. While collaborating as members of a SIGTE-sponsored panel presentation at a NECC conference, the authors found that although learning communities were a key feature of each of our PT³ projects, the design and implementation of these communities at our institutions were quite different. This article, then, examines the process and outcomes of building learning communities to increase faculty and preservice teacher use of technology through PT³ funding at our three institutions: National-Louis University, the University of Houston, and the University of Vermont.

Nurturing Learning Communities

Focused on something in common, members of learning communities share knowledge and experience. Their learning occurs “through interactions and relationships in networks of others who are experiencing and working on the same challenges and tasks . . . They learn from other people, and consciously or unconsciously teach other members, through a matrix of relationships and social exchanges” (Wenger & Snyder, 2000, p. 1). Such groups may have direct, virtual, and/or indirect (through correspondence) contact (Lenning & Ebbers, 1995).

The literature on establishing effective learning communities in higher education includes references to clinical experiences linking students, cooperating teachers, and faculty; Professional Development Schools (PDSs); cohort groups; faculty development through learning communities (e.g., peer coaching and team teaching); constructivist college approaches that encourage students and faculty to be co-learners (e.g., Kiffer, 1985); online learning communities (currently receiving the bulk of attention); and the university itself as a learning organization.

All of us belong to multiple, intersecting communities of practice. Although faculty at research universities tend to have discipline-based learning communities, those in liberal arts and community colleges tend more toward learning communities that “are an extension of teaching” (Lenning & Ebbers, 1995, p. 97). Further, Lenning and Ebbers outlined four types of college-level student-oriented learning communities and listed benefits for both students and faculty.

Benefits for students include . . . improved quality of thinking and communicating, a better understanding of self and others, and a greater ability to bridge the gap between the academic and social worlds. Faculty benefits include diminished isolation, a shared purpose and cooperation among faculty colleagues, increased curricular integration, a fresh approach to one's discipline, and increased satisfaction with their students' learning (1995, p. iv).

Saltiel and Reynolds' (2001) review of the literature on "learner connections," including learning communities and cohort groups, identified greater student outcomes in the area of affective rather than cognitive learning, although they noted improved connections of theory and practice and transfer to future areas of study. Likewise, Brush et al. (2001) reported increased expectations for authentic technology use by preservice teachers in field-based teaching experiences shaped by a collaborative network of K–12 teachers and university faculty.

In an ERIC Digest, Abdal-Haqq (1995) summarized characteristics of schools, colleges, and departments of education (SCDEs) that have successfully revised their preservice teacher education programs to infuse technology; of five characteristics listed, three fall within the concept of learning communities: (a) close ties of the SCDE to K–12 local schools, (b) exposure to technology-rich K–12 classrooms, and (c) collegial support for change within the SCDE. The National Council for Accreditation of Teacher Education [NCATE] 2000 standards call for collaboration between the SCDE unit and its school partners (Standard 3), and state that the SCDE unit should serve as an information technology resource to other institutions and the community (Standard 6). More specifically, NCATE recently adopted five standards for PDSs that include a standard titled "Learning Community" (Standard I) and another that focuses on collaboration (Standard III) (NCATE, 2001).

Providing leadership to learning communities involves helping others "define and limit [their] possibilities for learning" (Heaney, 1995, p. 2). Further, as explained by Wenger and Snyder (2000), "Nurturing healthy communities is more like tending a garden than building an engine—they thrive on the personal energies and relationships of members" (p. 5). In addition to meeting academic and curricular needs, leaders must monitor and manage the dynamics of a learning community, including: interaction, cohesiveness, task commitment, active participation, trust, and integration of theory and practice (Saltiel & Reynolds, 2001). These key elements are similar to those described by Borthwick (2001) for establishing and maintaining collaborative partnerships through attention to: focus (goals, context, outcomes); members (general characteristics, commitment, roles and responsibilities); needs and resources (funding and other material resources; connections, sharing, exchanges); interactions (communications, decision making and action planning, group dynamics, inquiry into partnership process); and stages. Likewise, Chuang, Thompson, and Schmidt (2003) described elements common to models for effective technology mentoring in higher education and K–12 schools, including vision for technology use, breaking down hierarchical structure, open dialogue, and providing mutual benefits. They also noted that such programs "tend to emphasize the creation of learning communities among and between mentors and mentees" (p. 105). Broadening the base of participants in the community enhances the potential for change (Moore and Brooks, 2000). Further, as explained by Eckel, Green, Hill, and Mallon in a primer on change in higher education,

Linking . . . disparate efforts can provide additional energy and ideas. Helping groups become connected overcomes a sense of isolation, creates synergy, provides multiple opportunities for participation, and allows people to benefit from the trials and learning of others (1999, pp. 40–41).

Below are descriptions of three PT³ projects in which participants worked to build communities of learning to address issues related to integration of technology in both teacher preparation and K–12 curricula. These communities involved preservice and graduate students, K–12 teachers, and higher education faculty and staff from both education and arts and sciences.

Building PT³ Learning Communities

PT³ projects at National-Louis University (NLU), the University of Houston (UH), and the University of Vermont (UVM) all included learning communities among their goals:

- Using communications technology, develop an extended community of learners including preservice students, recent graduates of PT³ cohorts, K–12 master teachers, and faculty (NLU)
- Develop networked learning communities to support preservice teachers (UH)
- Build community among college faculty and K–12 teachers to support student learning (UVM).

However, each project's approach to developing community in support of technology learning by preservice students was distinct. A brief introduction to each project (see Table 1) is followed by a comparison of the processes for building community as well as related achievements and challenges (see Table 2.)

Introduction to Three PT³ Projects

National-Louis University (NLU) is a multi-campus university with its center of operation in Chicago, Illinois. NLU's PT³ grant, *Transforming Learning and Teacher Preparation through Technology-Rich Cohorts*, was a joint effort between the university and two school districts, Milwaukee Public Schools in Wisconsin and Prince William County Schools in Virginia, to provide technology-literate elementary and secondary teachers for these districts which must fill hundreds of teacher openings each year. Both university classes and field experiences were held within these districts. The grant provided laptop computers to preservice students, technology training to NLU professors, and opportunities for online communication.

Although the University of Houston has a notable history of providing innovative teacher education programs for urban, at-risk populations, its PT³ grant project, *Action Communities for Teaching Excellence*, was inspired by some significant challenges. Using an approach grounded in community-based action research, UH worked with key representatives from area school districts, faculty, and even teacher candidates to identify and propose solu-

tions to these challenges. Project goals focused on a comprehensive technology experience throughout the preservice program and included student and faculty use of laptop computers, electronic portfolios, virtual field experiences and new models of faculty and student learning. The PT³ grant broadly envisioned the establishment of inclusive, networked learning communities to include College of Education faculty, teacher education students, and K–12 teachers working together to achieve common goals, with technology as the link for distant community members.

The UVM implementation grant, Technology F.E.A.T. (From Entry to Adaptation to Transformation) focused on helping teachers learn to use technology tools and resources in their teaching and professional practices, recognizing the different stages of use that one travels in adapting a new innovation. However, focusing on only preservice student technology instruction in the past limited impact on the ultimate learner, the K–12 child. Without seeing the application of technology in teaching and learning, preservice teachers were having difficulty making the transition to using technology in their own K–12 classrooms. Thus, the UVM project focused on increasing skills of both K–12 cooperating teachers and UVM faculty. (See Table 1 for a list of project goals.)

Design for Learning Communities: The Role of Boundary Spanners

As mentioned above, participants in the three PT³ projects represented various groups, including preservice and graduate students, K–12 teachers, and higher education faculty and staff from both education and arts and sciences. A key role in each project was that of boundary spanner, one or more individuals who understand, communicate, and help to meet the needs of various constituencies who make up the community. Beyond the PT³ project directors, other boundary spanners for the three projects were quite diverse: grant personnel (technology facilitator and integration specialists) at NLU, Technology Fellows at UH, and preservice students who served as mentors at UVM. (See Table 2.) The descriptions below will illustrate how boundary spanners were integral to the success of each learning community.

Grant personnel as boundary spanners (NLU). Personnel involved in the NLU grant included the director who served as primary boundary spanner from university to the school districts, and elementary and secondary preservice faculty advisors and instructors. Each site (Wisconsin, Virginia) also had a technology integration specialist who taught an introductory class in educational technology, answered technology-related questions from the students and faculty members, facilitated online instruction, coordinated electronic portfolios, and supported technology integration. In addition, this individual provided supervision of technology-integrated field-based lessons, while looking for exceptional preservice teacher lessons to post to the NLU PT³ Web site. In Virginia, two part-timers actually shared the position of technology integration specialist. Finally, the grant provided a Chicago-based technology facilitator whose job was to coordinate the online

community and provide education and arts and sciences faculty with small-group and individualized technology training. In addition, the facilitator ordered and configured laptops and other equipment purchased through the grant, maintained the WebCT online instructional component, and was involved in the development of electronic portfolios. The PT³ Web site included examples of work done by the teacher-trainees and videos of exemplary lessons, so that other students and sites could benefit.

Each school district also provided an individual who managed the district's responsibilities of the grant, including providing classroom space, meeting technology needs, facilitating clinical placements, and facilitating contact with other district personnel whose skills were needed by the grant to ensure its local success.

Technology fellows as boundary spanners (UH). At UH, graduate Technology Fellows worked directly with preservice teachers as well as with faculty members, giving Fellows a unique and unifying perspective on both sides of the technology integration equation. Technology Fellows taught preservice technology labs, working as a team with Instructional Technology faculty to design standards-based, constructivist learning experiences that placed technology use appropriately within other program objectives. Fellows also worked with faculty following initial interviews by grant Curriculum Specialists to find out what faculty members taught, how they taught it, and how, if at all, they had considered using technology in their teaching. These initial interviews were followed by ongoing individualized support from Technology Fellows in the form of weekly meetings with some faculty to strengthen basic technology skills, to only occasional checkpoints with others who were more secure in their use of technology. Fellows worked with faculty in their offices, and sometimes at their homes or in coffee shops on their own computers at whatever pace they were comfortable with. The beginning focus was on introduction, practice, and mastery of technology skills and procedures for personal and professional productivity. Later, project staff continued close contact with their faculty clients, assisting, brainstorming, and revising as faculty implemented technology in their courses.

Preservice mentors as boundary spanners (UVM). Initial UVM PT³ activities motivated faculty and teachers to use technology tools but fell short on being able to provide all the professional development and support that was needed by faculty and teachers to apply these skills in their classrooms. Further analysis of a professional development survey of college faculty indicated that most liked learning on a one-to-one basis, rather than in traditional workshops or classes. K–12 teachers reported having difficulty in implementing what they learned when back in their classrooms due to the complexity of some of the skills and their lack of experience in managing groups of K–12 students and technology at the same time. The UVM grant team consisted of a project manager, a professional development coordinator and a half-time graduate assistant; however, the staff was inadequate to handle the one-on-one support that was being requested. UVM realized they had a wonderful natural resource that was being under-used: preservice

students. As it turned out, the students were more than a support system, they were the glue connecting faculty and K–12 teachers. The PT³ grant team enlarged its community by creating a student mentor program. This effort began modestly with only a few students, but within only two semesters grew to more than 20 students, 13 UVM professors, and 14 K–12 teachers.

At the faculty level, preservice teachers worked as mentors to assist professors in learning new technology skills. Projects ranged from creating professional, online portfolios or class Web pages to digital video clips and electronic presentations. The PT³ project manager supervised the work of the student faculty mentors by recruiting students and faculty, matching student skills with the expressed needs of the professor, and setting goals and expectations. As student and professor undertook projects together, the context of their association changed. The student in this instance became the teacher, and the teacher became the student, a shift that created an environment for mutual learning. Whereas the faculty member learned new technology skills, the student learned about the goals, aspirations, and outcomes the professor hoped to achieve. Faculty members who have participated in this project often remarked that working with a student mentor to create an online assignment or syllabus helped faculty create a better product; conversations with a mentor helped the faculty refine their instructional strategies.

In cooperation with two partner school districts, Burlington and South Burlington, preservice teachers built a community with K–12 teachers and their students. The program was administered by an Outreach Coordinator (liaison and support person) who worked with a preservice student (i.e., the mentor) and a K–12 teacher; together, as a team, they established goals for classroom technology projects. Classroom teachers appreciated these “on-site” and personal resources that were backed by University resources. Student mentors enabled teachers to take risks and adopt new strategies for building knowledge with their students. Success with the goals set in connection with a student mentor project encouraged many K–12 teachers to learn more, to enroll in more courses or workshops, to initiate new projects, and to bring more technology into the daily activities of their students. Preservice students were also excited about this opportunity for learning in a K–12 setting. They reported that their own technology skills were reinforced; they began to see the challenges that teachers faced in scheduling, managing, and integrating technology in effective ways; they grew intellectually and emotionally by participating in conversations about curriculum, learning, and assessment issues; and they ultimately created a community of learning with common goals to address mutual needs.

Development of Learning Communities: Activities, Anchors, Outcomes

Just as boundary spanners for each of the three PT³ projects differed, so did the activities and anchors around which activities were planned. (See Table 2.) With its distant sites, NLU anchored

its activities around online communication. UH’s activities were developed in support of its new preservice technology lab sections and revisions to other preservice courses, and UVM focused on standards-based lessons and electronic portfolios.

Preservice Cohort Online Connections (NLU). A variety of methods were used to enhance communication within NLU cohorts at one site and among cohorts across the multiple locations. One method for facilitating communication was to use the NLU PT³ Web site to house several online courses. Each of the cohorts took a six-hour series of foundations classes that were completed largely online. Students received training in using WebCT at their respective sites and then communicated with faculty members and fellow cohort members through WebCT features. In this way, participants posted introductory information about themselves (including, for some, a digital video) and could e-mail, chat, and post communications that were needed for required assignments. Technology education faculty in Virginia designed a Web site containing links that aided students in using specific technologies and integrating technology their lessons. This Web site was available to all teacher education students and faculty, again facilitating communication across sites. Another method used by the PT³ technology facilitator was to post information about each of the Chicago-area faculty who received training under the PT³ grant and who might be willing to communicate with teacher trainees through the online community. In this way, when teacher-trainees wanted mentoring on a lesson they were developing, they could communicate with an NLU faculty expert for assistance.

Work-related student community through technology lab session development and support (UH). Preservice students at UH were asked to provide input to the redesign of a three-hour technology course, and as a direct result of project efforts, that single course was divided into three one-credit-hour lab sections. Early on, UH established Web-based discussion groups to encourage discussion of course projects and other topics. Students from all lab sections came together virtually, allowing them to ask questions about the course, inquire about other courses, and to share successes and frustrations about their growing understanding about the teaching profession. The online communication that first semester often turned to thoughts about this new course structure, and the open discussion medium led to an interesting mix of venting frustrations, complaints, and eventually, to students working together with course instructors to understand new processes.

The promise of establishing communities of learners began to be realized the second semester, as students began the second of the three lab courses. They were now in classes with students they knew previously only by name and discussion contributions. The entire group stayed together on the same discussion group, ensuring consistency in dialogue and protocol. Once students were in the third lab section, as well as field-based at professional development schools, the discussion groups served an even more vital role in maintaining contact among learning community members. Students who before could only naively guess at instructional strat-

gies and technology uses in the classroom were coming face-to-face with the real challenges of teaching. The sharing among their colleagues online was proving to be more than simply a run-down of problems or questions. Students were truly relying on their peers to help them think through challenging classroom situations, find appropriate teaching resources, brainstorm ways technology might be used in a lesson, and generally face teaching together rather than in the isolated ways teachers typically operate.

Community among faculty at UH. The UH project team's work with faculty during the first year of the project can be portrayed by three distinct stages of focus. The beginnings of faculty community were found at an individual level (faculty working with curriculum specialists), but then spread to content-area teams and beyond. In addition, for all faculty the UH team offered weekly Power Lunches on technology-related skills and knowledge topics that were identified as common needs. These whole group times allowed faculty members to come together for mutual learning goals, broadening that learning community beyond the individuals.

After the first two semesters of individual attention on technology skills, the project moved into Stage 2, characterized by a focus on technology integration and curriculum refinement. A retreat at a local hotel brought faculty members together to discuss specific technology tools and teaching strategies that could strengthen their courses. Armed with copies of their syllabi, faculty faced the real issues of change and began considering the levels of modifications with which they were comfortable. This initial retreat was followed by the offer of Individual Institutes during the summer. Fifteen faculty members participated in these institutes, in which project staff worked through a series of meetings with each faculty member to consider how a particular course was taught, how technology might be included, what specific course goals could be met with specific technology tools, and a design for how the changes could be carried out. Some of the Stage 2 work involved having content area teams collaborate for overall program inclusion of technology. These faculty participants ended the summer with revised syllabi and enthusiastic outlooks for Stage 3, the implementation of these newly revised courses within the teacher education program.

Professional development strategies for college faculty and K-12 teachers (UVM). Using self-reported assessment data from UVM faculty and consultation with district technology coordinators, a medley of approaches were designed to help college faculty and K-12 teachers learn about and use technology. These approaches included: summer courses, fall and spring workshops, online modules, winter session workshops, model lessons, and just-in-time support.

Face-to-face summer courses focused on two initiatives: *Standards Into Action* and Web-based digital portfolios. *Standards Into Action* (www.standards.ed.state.vt.us) is a Web and standards-based K-12 curriculum design and assessment tool developed by IBM in conjunction with the Vermont State Department of Education. This Web site offers templates to help educators link lessons

and units that they have created to the *Vermont Framework of Standards and Learning Opportunities* and supplies a searchable database with a repository of educator-juried products. Both preparing and practicing educators used posted units to help them develop their own units appropriately and flexibly. In addition, using this resource promotes understanding of standards-based instruction, and the link between standards and rubrics for assessment. The purpose of *Standards Into Action* is to develop an educational community that shares resources, engages in discussion, and enables the construction of projects by remotely located participants. During the summer course, staff hoped they could pair participants by subject areas of interest; however, most of the people recruited were from the K-12 arena, with only three of the university faculty participating.

Electronic Portfolios, the second UVM summer course, was initiated to help teachers and faculty build their own digital portfolios and to gain a better understanding of what students experience in constructing portfolios. As a state-approved teacher preparation program, the College of Education and Social Services had the responsibility for reviewing its teacher candidates' portfolios and recommending candidates for licensure as teachers. An increasing number of students had chosen to construct these portfolios electronically, building upon the skills they learned in their first year course to create Web-based models. This number had grown from 8% in Spring 1999 to 58% in Spring 2002. Thus, the summer course focused on the technology skills needed to construct digital portfolios. Five university faculty participated along with 20 K-12 teachers. During the course, participants were excited about developing professional portfolios and many began their own. Others created templates for their students. However, during the following semester, participants found themselves too busy to revisit their portfolios. Without having practiced the skills they had learned, they reported needing additional support, eventually addressed through implementing the preservice student mentoring program described in the section above on boundary spanners.

Additional faculty outcomes. All three PT³ projects have reported achievements that include growth in technology knowledge and skills of project participants. In addition, participants commented on the opportunity to connect with others in their learning communities. For example, during a series of four four-hour training sessions, NLU faculty particularly appreciated the time to talk with and learn from other colleagues attending the sessions. As expressed by one participant, equally beneficial was "my having established interpersonal links with [facilitator] and other colleagues [who] I can call on for future development."

Challenges to Building Learning Communities

Overall, our three PT³ projects continue to look for ways to improve communication among the faculty, preservice students, and K-12 partner schools and to understand and meet the real needs

of all learning community members. We are striving to find models of effective use of technology that are applicable to the teaching and research interests of our faculty. And we are looking for new ways to share information, encourage participation, and to support systemic change in the process of teaching and learning with technology.

Involving Faculty in the PT³ Learning Community (NLU). With the majority of NLU's faculty located on five campuses spread across the Chicago area, the PT³ grant sought to involve faculty in a project that was occurring at several distant sites (Wisconsin in Year I and Virginia in Year II). Although the grant achieved several of its goals related to faculty development, challenges arose around meaningful faculty involvement with project activities in the distant sites. To date the only faculty who have really established connections with PT³ students in Wisconsin are those who have accepted online or face-to-face teaching assignments with the Wisconsin cohort. (Thus far, no Chicago-area faculty have been instructors for the Virginia cohort.) Participation in grant activities, of course, relates to faculty motivation and incentive to make time for learning new technologies and establishing collaborative activities. Although NLU's grant proposal did not build in funding for faculty participants, the number of faculty members who voluntarily devoted time to attending the PT³ training has been impressive. Learning to use new technologies may meet personal or professional goals or help faculty integrate technology in the courses they teach. As one faculty member commented, "[The training] put technology on [the] front burner—[and] resulted in me doing [a] Web enhanced course this quarter." One way to involve faculty and motivate their continued learning is to encourage their participation in some sort of collaborative project (Vannatta & Beyerbach, 2000). However, connecting faculty goals to grant goals is more difficult. See Figure 1, a model used with faculty to help them consider how to align goals of all four circles, representing their personal/professional goals, faculty course-related instructional goals, PT³ goals, and K-12 goals.

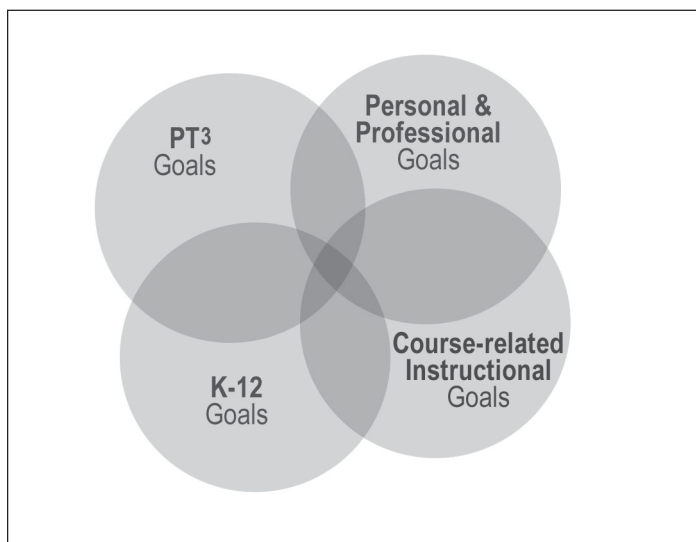


Figure 1. Matching faculty goals with project goals.

Connecting faculty interests and needs to those of cooperating teachers and preservice students provides yet another challenge. See Figure 2, another model used by faculty to consider how their goals might align with goals of the grant and goals of other participants illustrated by the five circles. Bringing in preservice students to share technology lessons they are trying in their student teaching is one idea for enhancing connections, along with the possibility of presentations by inservice teachers enrolled in NLU's Technology in Education master's program. The latter is based on O'Bannon and Vannatta's (2001) report of enthusiasm generated at a kick-off training event when inservice teachers discussed methods they were using for integrating technology in their classrooms; this strategy was successfully used in the NLU PT³ training in February 2002. Another challenge lies in convincing arts and sciences faculty about the need for examples of K-12 integration. As shared by one faculty member, "I was amazed that the focus of the PT³ training (and the apparent interest of the [education] faculty attending) was on the content of teacher training (what kids can do), rather than on the *adult* pedagogy faculty are engaged in (what faculty can do using technology with their *adult* students)" [italics original]. These are perspectives and perceptions important to consider when planning for learning experiences with diverse community members.

Connecting student and faculty learning communities (UH). UH faculty and student learning communities have developed independently during the initial years. Although not entirely an intent of the original design, UH project staff believed that this parallel development was necessary to encourage participation of each group within a safe environment. However, as successful as these parallel communities proved during the first years of the project, UH is confident that the goal of more inclusive communities requires them to bring the two sides together.

One approach to the meshing of these traditionally distinct communities might involve inviting faculty to participate in "cohort" communities, meaning that all students entering the teacher education

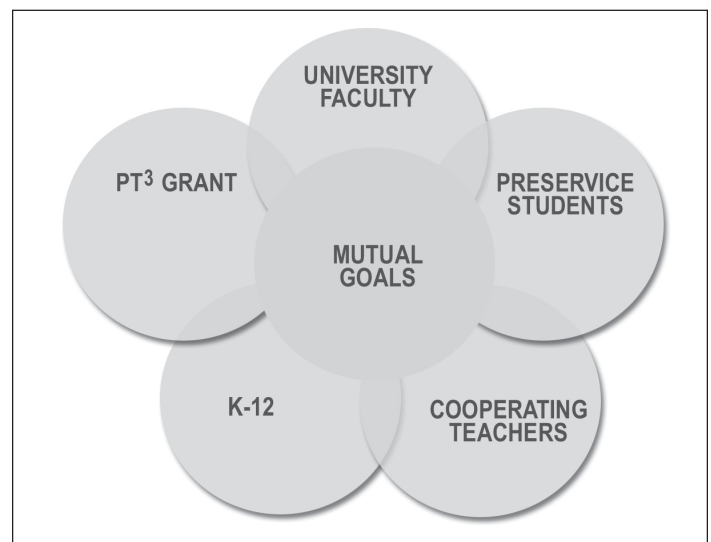


Figure 2. Meeting the personal, professional, and course-related needs of faculty, students, and cooperating teachers through grant-related activities.

program at the same time would work throughout their program and on into their induction years with a limited number of faculty. A second approach would entail forming more content or interest-based learning communities, such as social studies education, or other more specific interests, such as teaching special needs populations. These learning communities may prove more challenging to establish, with both faculty and students needing to dedicate considerable effort to the planning and participation; however, the increased focus on purpose may in the long run encourage more meaningful and long-lasting participation. Finally, faculty, students, and even cooperating teachers might be brought together for real purposes, such as multi-level curriculum design teams. By continually reevaluating purposes and goals jointly with all community participants, UH anticipates that the process of establishing and maintaining learning communities will be representative of all participants.

Conclusions and Recommendations

Learning communities in these three PT³ projects focused on improving the use of technology in college and K–12 classrooms. Each project proceeded somewhat differently to achieve this goal, but all attempted to connect members (preservice students, college faculty, field site per-

sonnel) so that they could share knowledge and experience. In each case, methods involved reducing isolation through improved communication. We learned that specific strategies we implemented served to nurture and strengthen connections within and across groups. Seven of these strategies are listed below.

Involve multiple voices. The University of Houston (UH) worked as a learning community right from the start, involving key representatives from area school districts, faculty, and even teacher candidates. The latter were invited to provide input into the redesign of course structure and course components. At the University of Vermont (UVM), student mentors fulfilled the active role of boundary spanners, linking project participants.

Reinforce common goals and mutual benefits. National-Louis University (NLU) worked with school districts who had high need for new teachers, while UVM emphasized professional development for K–12 teachers as well as university faculty. Borthwick (2001) confirmed that project focus and mutual benefit were key elements in sustaining member participation in school-university collaboration.

Build on the match between faculty, course/program, and PT³ goals. All three projects mentioned electronic portfolios as a preservice program need, and UVM focused on portfolio devel-

Table 1: Goals and Participants of the Three PT³ Grant Projects

Goals	Participants
National Louis University	
Transforming Learning and Teacher Preparation Through Technology-Rich Cohorts	
Prepare new, technology-proficient teachers for participating school districts.	NLU Education and Arts & Sciences faculty (all locations including five Chicago-area campuses and centers in Wisconsin, Virginia and Florida)
Using communications technology, develop an extended community of learners including preservice students, recent graduates of PT ³ cohorts, K–12 master teachers, and NLU faculty.	Preservice teachers in Wisconsin and Virginia cohorts
Train 100 NLU Education and Arts & Sciences faculty, increasing engagement in the PT ³ learning community as participants, resources, and facilitators.	Milwaukee Public Schools (WI) and Prince William County Schools (VA)
University of Houston	
Action Communities for Teaching Excellence	
Networked learning communities to support preservice teachers	UH College of Education faculty
Access to current-model portable computer technology	
Comprehensive, connected and extended technology experience	UH College of Education preservice teachers
Meaningful and connected opportunities to develop technology proficiency	Seven Houston-area school districts.
Student electronic portfolios	
Virtual field experiences to campus-based students through technology	
Unique campus resources to field-based students through technology	
New models of teaching and learning	
University of Vermont	
From Entry to Adaptation to Transformation (F.E.A.T.)	
Build community among college faculty and K–12 teachers to support student learning.	UVM faculty and preservice teachers
Offer a medley of professional development opportunities to faculty and K–12 teachers in field placement sites.	K–12 teachers in UVM field sites
Instruct preservice faculty and K–12 faculty in the use of <i>Standards into Action</i> .	
Extend the use of the electronic portfolio to all students and faculty.	

opment as an anchor for increasing faculty, K–12 teacher, and preservice student technology skills.

Connect “distant” community members. While NLU had participants from several states, UH also considered needs of on-campus students who may not have face-to-face contact, especially

during field experiences. New opportunities for online communication were used effectively to let students express concerns about new course structure and to enable sharing of methods for technology integration (UH), to host online classes (NLU), and to link to resources and examples of best uses of technology (NLU).

Table 2: Comparison of Selected Elements of the Three PT³ Learning Communities

Elements	National-Louis University	University of Houston	University of Vermont
Goals of Collaboration	Develop extended community	Support preservice program	Support student learning through increased skills of K–12 cooperating teachers
Design	—	Approach grounded in community-based action research	—
Structure	Multiple levels	Multiple levels	Multiple levels
Members (to date)	Preservice, university faculty	Preservice and graduate students, university faculty	Preservice, university faculty, cooperating teachers
Boundary Spanners Beyond the Project Director	Technology Integration Specialists (Wisconsin & Virginia); Technology Facilitator (Chicago)	Technology Fellows	Outreach Coordinator; preservice students who served as mentors to university faculty and cooperating teachers
Vehicle	Cohort connections and faculty involvement through online community; online preservice courses; F2F training sessions for faculty	Web-based discussion groups; work-related student communities (lab sections) & faculty communities (Power Lunches, retreat, summer institutes)	Summer courses, academic year workshops, online modules, model lessons from Standards Into Action Web site, focus on electronic portfolios, just-in-time support
Development	Around laptops and online communication for preservice students	Around new preservice lab sections & other courses	Around standards-based lessons and electronic portfolios
Outcomes	Improved faculty-student communication across distant sites; faculty training, including interpersonal technology-oriented contacts	New preservice labs to replace course; faculty redesign of syllabi to integrate technology in courses; improved curriculum	Meeting K–12 teachers' semester goals and increased experience knowledge for preservice students
Challenges to Building Community	Meaningful faculty involvement in distant sites	Incentives to participate	Preference for one-on-one learning opportunities
Future Plans for Learning Communities	Increase communication across distant sites as new cohorts are added	Combined student/faculty community (cohort or theme-based); extended community (curriculum design)	—
Collaborative Process Elements (see Borthwick, 2001)	Connections, Sharing, Exchanges for mutual benefit	Common goals, trust (group dynamics), worth (outcomes/benefits), communication, action planning, stages	Context, common goals, connections, sharing, exchanges for mutual benefit, trust

Provide opportunities for learning in community. UVM noted that preservice student mentors of faculty/teachers grew both intellectually and emotionally by participating in conversations about course design and goals, course assignments, learning outcomes and assessment strategies. UH described how students relied on their peers in online discussion groups to help them think through challenging classroom situations, find appropriate teaching resources, and brainstorm ways technology might be used. NLU faculty appreciated PT³ training because it gave them time to talk with their peers, identifying new applications that others had used successfully and networking to meet personal goals by working with peers, PT³ staff, and other presenters.

Consider dynamic configurations. UH's subgroups included dyads (faculty working with grant Technology Fellows), content-area teams, and "Power Lunch" groups; and the project was considering developing cohort communities—interest-based learning communities of college faculty and K–12 teachers.

Include incentives for faculty participation. A recent AACTE-sponsored survey found that SCDEs need to increase incentives for faculty integration of technology in their instruction (Wepner, Scott, & Haysbert, 2003). All three PT³ projects (NLU, UH, UVM) mentioned consideration of incentives for faculty participation. Faculty have many responsibilities and opportunities, but only limited time. Heaney (1995) concluded that member "participation can be either centripetal or centrifugal. Centripetal participation moves us inward toward more intensive participation so that our learning and work influences" the culture and definition of the learning community (p. 3). Centrifugal participation means members remain on the periphery, and are less likely to participate regularly.

Implementing strategies to nurture communities takes time—time for soliciting perceptions and collecting data (beyond numbers of attendees at meetings), time for multiple voices to share input, and time for thoughtful consideration and discussion of how to proceed. With the right leadership, operationalizing the concept of learning community can serve as the basis for refinement of project goals and continued project success. Process vari-

ables that should be analyzed include the context(s) of community members, roles and responsibilities—especially of boundary spanners, development of trust, communication and action planning, and common goals and mutual benefits. Action planning must include a *focus on process goals* to develop the learning community, as well as a *focus on project activities* to enhance knowledge, skills, and application of technology. Otherwise, the commitment of members of the learning community will be inconsistent at best.

To enhance the success of faculty, student, and field uses of educational technology, each of the grant projects described in this article sought to develop a learning community. PT³ Program personnel (faculty and staff) were responsible for nurturing relationships among community members to enable participants to reach project and personal goals. Other members of the learning community helped with this nurturing, as seen in UH's Technology Fellows and UVM's preservice student mentors. As noted above, faculty, students, and K–12 teachers, all accustomed to working independently and or in their own smaller circles, began to share knowledge, skills, frustrations, and successes for the benefit of all. Learning together in community brought challenges, changes, and, most of all, progress in preparing tomorrow's teachers to use technology.

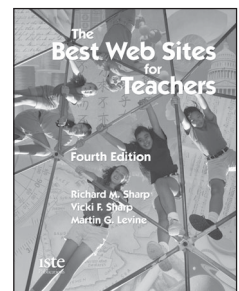
References

- Abdal-Haqq, I. (1995) *Infusing technology into preservice teacher education*. ERIC Digest. (ERIC Document Reproduction Service No. ED389699). Retrieved October 15, 2001, from http://www.ed.gov/databases/ERIC_Digests/ed389699.html.
- Borthwick, A. C. (2001). Dancing in the dark? Learning more about what makes partnerships work. In R. Ravid & M. Handler, (Eds.), *The many faces of school-university collaboration* (pp. 23–41). Englewood, CO: Libraries Unlimited.
- Brush, T., Igoe, A., Brinkerhoff, J., Glazewski, K., Ku, H., & Smith, T. C. (2001). Lessons from the field: Integrating technology into preservice education. *Journal of Computing in Teacher Education*, 17(4), 16–20.
- Chuang, H., Thompson, A., & Schmidt, D. (2003). Faculty technology mentoring programs: Major trends in the literature. *Journal of Computing in Teacher Education*, 19, 101–106.



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Eckel, P., Green, M., Hill, B., Mallon, W. (1999). *On change III: Taking charge of change: A primer for colleges and universities*. Washington, DC: American Council on Education.

Heaney, T. (1995). *Learning to control democratically: Ethical questions in situated adult education*. (ERIC Document Reproduction Service No. ED 397 238)

Kiffer (1985). *Prerequisite for common learning: An uncommon faculty*. Paper presented at the National Conference on Higher Education of the American Association of Higher Education, March, Seattle, WA. (ERIC Document Reproduction Service No. ED 259 609)

Lenning, O. T., & Ebbers, L. H. (1995). *The powerful potential of learning communities: Improving education for the future*. (ASHE-ERIC Higher Education Report Volume 26, Number 6). Washington, DC: George Washington University Graduate School of Education and Human Development.

Moore, A. B., & Brooks, R. (2000). Learning communities and community development: Describing the process. *International Journal of Adult and Vocational Learning*, 1, 1–15.

NCATE 2000 Standards: Technology Integration and Resource Indicators. (n.d.). Retrieved December 10, 2003, from http://www.catalise.org/starchart30/webcast/pdf/NCATE_Tech_Expectations.pdf

National Council for Accreditation of Teacher Education [NCATE]. (2001). *Standards for professional development schools*. Retrieved October 13, 2002, from http://www.ncate.org/2000/pdsstands_10-00.pdf

Saltiel, I., & Reynolds, K. (2001). *Student connections: An integrative model of cohorts, community and learning*. Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA. (ERIC Document Reproduction Service No. ED 451 812)

Wenger, E., & Snyder, W. (2000, Summer). Learning in communities. *LINE Zine*. Retrieved July 3, 2002 from <http://www.linezine.com/1/features/ewwslc.htm>

Wepner, S. B., Scott, S. A., & Haysbert, J. (2003). What are colleges and universities doing to promote technology initiatives? *Journal of Computing in Teacher Education*, 20(1), 17–27.

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