FINAL REPORT

P3T3: Purdue Program for Preparing Tomorrow's Teachers to use Technology
P342A000075

Purdue University
West Lafayette, Indiana

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Executive Summary

P3T3: Purdue Program for Preparing Tomorrow's Teachers to use Technology (#P342A000075), a 2000 PT3 implementation grant, was designed to: (a) prepare pre-service teachers to demonstrate fundamental technology competencies, using technology as a tool for teaching/learning, personal productivity, communication, and reflection on their teaching; and (b) prepare teacher education faculty in Education, as well as colleagues in Science and Liberal Arts and selected graduate teaching assistants, to teach pre-service teachers in technology-rich environments, modeling approaches that future teachers should use themselves when they teach K-12 students.

Through partnerships involving Purdue academic schools, four Indiana school districts, and education and corporate entities, the project met its goals via three complementary components: (a) a faculty development and mentoring program designed to assist the faculty in learning new teaching/learning technologies and effectively modeling their use in teacher education courses; (b) technology-enabled distance field experiences for pre-service teachers in diverse settings; and (c) the development of a dynamic electronic portfolio system for pre-service teachers.

An estimated 3000 pre-service teachers, 90 university faculty members, and 50 K-12 school personnel were directly impacted by this project. There was broad participation by the faculty of the School of Education, as well as limited participation by the faculty in Liberal Arts and Science, in the faculty development activities of the project. A high percentage of faculty reported revising courses to integrate or better integrate technology in instruction for pre-service teachers. Both faculty and student proficiency with technology was positively impacted by the project. According to student reports, use of technology in classes grew from less than half of the faculty at the beginning of the project to essentially all of the faculty by the end of the project.

A large-scale web-based electronic portfolio system was developed and implemented during the project. Beginning in fall 2002, the use of electronic portfolio assignments in core teacher education courses became a requirement for all teacher education students at the university. Use of electronic portfolios became a core element of the teacher education programs and a key element in accreditation review. To sustain the use of portfolios, a full-time database administrator was hired to work with the electronic portfolio system.

A number of teacher education faculty members integrated the use of two-way video conferencing technology into their classes to link with K-12 schools at a distance for what might be termed “virtual” field experiences. This initiative, impacting hundreds of teacher education students as well as many K-12 teachers and students, established various successful models for linking university teacher education programs with K-12 classrooms.

Overall, the project was deemed very successful. The project achieved most of its objectives, and it had a significant impact on the teacher education programs at Purdue University that is expected to continue for many years to come.

Report Narrative

Project Overview

P3T3: Purdue Program for Preparing Tomorrow's Teachers to use Technology (#P342A000075) was a 2000 PT3 implementation grant designed to improve teacher preparation with respect to the use of technology at Purdue University, West Lafayette, Indiana. The overall goals of the project were to: (a) prepare pre-service teachers to demonstrate fundamental technology competencies, using technology as a tool for teaching/learning, personal productivity, communication, and reflection on their teaching; and (b) prepare teacher education faculty in Education, as well as colleagues in Science and Liberal Arts and selected graduate teaching assistants, to teach pre-service teachers in technology-rich environments, modeling approaches that future teachers should use themselves when they teach K-12 students.

The School of Education at Purdue was the lead organization on the grant. Local partners included the Schools of Science and Liberal Arts as well as Information Technology at Purdue (ITaP), the campus-wide technology support organization. The project established partnerships with four Indiana schools districts: Crawfordsville Community Schools, Lafayette School Corporation, Metropolitan School District of Lawrence Township (Indianapolis), and School City of East Chicago. Other partners included: the Center for Interactive Learning and Collaboration (CILC), the North Central Regional Technology in Education Consortium (NCRTEC), Apple Computer, Intel Corporation, and the Indiana Department of Education.

The project met its goals via three complementary components that supported on-going teacher education reform efforts at the institution: (a) a faculty development and mentoring program designed to assist the faculty in learning new teaching/learning technologies and effectively modeling their use in teacher education courses; (b) technology-enabled distance field experiences for pre-service teachers in diverse settings; and (c) the development of a dynamic electronic portfolio system for pre-service teachers. These three components are briefly described below.

The faculty development component of the P3T3 project focused on helping faculty members to acquire and refine technology knowledge and skills that they could integrate into their classes for prospective teachers. Two main emphases in the effort were: (a) modeling a problem-based and learner-centered approach to technology integration, and (b) supporting the faculty as they implemented personally developed technology integration plans. Faculty development strategies included: a "start-up" workshop designed to introduce faculty members to problem-centered applications of available technologies, skills development workshops, informal Techie Talk sessions designed to showcase technical topics and faculty success stories, a mini-grant program, a year-long mentoring and support program including one-on-one assistance from P3T3 graduate students, and the provision of supply and expense funds to support implementation activities or further personal development.

The technology-enabled field experiences were designed to address issues of diversity in candidates' field experiences. For colleges of education in rural locations, like Purdue, it can be difficult to place students in field settings that provide for needed experiences such as interaction with diverse student populations. As one way to address this problem, the P3T3 project made use of two-way video conferencing technology to

link pre-service teachers in university classes with K-12 students and classrooms in diverse communities at locations distant from the campus. The two-way video technologies, particularly those based on Internet-based video conferencing (e.g., equipment from Polycom, Inc.), were used to link with our partner school sites in communities such as East Chicago and Indianapolis. These experiences provided our pre-service teachers with opportunities to observe classrooms under the supervision of a faculty member, interact with students and teachers in diverse school settings at a distance from the Purdue campus, practice developing instructional materials for school-aged learners, and develop their ability to use video conferencing, a cutting-edge technology that is beginning to become more common in K-12 schools.

Portfolio assessment is becoming an important way to address competency-based standards for teacher education. Portfolios allow pre-service teachers to build rich collections of materials to document their teaching knowledge, dispositions, and performance. The use of electronic multimedia portfolios by pre-service teachers offers significant benefits in comparison to their paper counterparts including the ability to represent materials in multiple ways, ability to link to standards, reduced storage demands, accessibility, and students' development of technology skills through the process of creating the portfolio. As part of the P3T3 project, Purdue developed a dynamic web-based portfolio system built on a Microsoft SQL server database and with web-based access through active serve pages (ASP) technology. The system was designed to provide pre-service teachers with opportunities to select multiple ways of viewing their evolving teaching practice, reflect on that practice, and use digital multimedia representations of their work to meet performance-based assessments. The system was developed and implemented, becoming a requirement for all teacher education students admitted to teacher education on or after the fall of 2002.

An estimated 3000 pre-service teachers, 90 university faculty members, and 50 K-12 school personnel were directly impacted by this project. Faculties from the Schools of Education, Liberal Arts, and Science attended workshops and received support to learn to use and incorporate a wide variety of technologies in their teaching, research, and personal lives. Faculty members were given the tools, knowledge, and abilities to model for their students the use of current technology. As a result, many courses were revised to integrate or better integrate technology in instruction for pre-service teachers. As noted above, a web-based electronic portfolio system was developed, and the use of electronic portfolio assignments in core teacher education programs became a requirement in 2002. Several School of Education faculty members were able to use technology to link with K-12 schools at a distance to show pre-service teachers various aspects of the classrooms.

Pre-service teachers had increasing opportunities to learn in classrooms outfitted with up-to-date technology and from professors who were trained in and used technology. Pre-service teachers began to maintain their work from core classes in an electronic portfolio system where they were able to demonstrate their abilities and proficiencies to their professors and others. Many pre-service teachers were given the opportunity to work with K-12 children outside of the immediate Purdue area through video conferencing.

Evaluation data show a significant increase in use and abilities of both pre-service teachers and faculty with technologies such as word processing, spreadsheets,

presentation software, digital cameras, video conferencing, and hand-held technology tools. Teacher education students and faculty alike experienced fewer barriers to integrating technology into instructional programs than existed at the beginning of the project. Faculty used more technology in their teaching and requirements for courses. Faculty consistently rated their own abilities as proficient to intermediate while rating their students intermediate to introductory in proficiency with technology. Teacher education students rated faculty as proficient with technology. Students significantly increased their own proficiencies in general computer knowledge, Internet, e-mail, databases, presentation software, and overall.

A high percentage of faculty members participating in the project reported redesigning curricula to integrate or refine the use of technology in a teacher education course, leading to a broad impact on the teacher education program. Whereas only 43% of students agreed that faculty used technology in class at the beginning of the project, 99% of students agreed that the faculty used technology by the end of the project. Common classroom applications of technology included web-based research, student creation of multimedia presentations, use of the web to provide online course resources, and use of technology for assessment and evaluation.

Lessons were learned from the project and efforts were made to sustain project activities with regard to each of the three major implementation components of the project: faculty development, electronic portfolio development and implementation, and technology-enabled distance field experience. Specifics related to the outcomes and lessons from the project are detailed below.

Background and Origins

In the fall of 1999, after nearly ten years of planning, Purdue University began implementing totally reformed elementary and secondary teacher education programs which enroll approximately 2000 candidates annually. Purdue's new teacher education programs were designed to address perceived shortcomings of the former programs and to be responsive to trends in teacher education including the movement toward performance-based licensure of teachers. Courses in the new programs were phased in over a three-year period, with the final courses in the new programs first taught in spring 2002. The first candidates to complete the new programs graduated in May 2002. The P3T3 project, which was initiated in June 2000, played a significant role in supporting the on-going reforms and in preparing the institution for an NCATE accreditation visit, which took place in spring 2004.

Purdue’s reformed teacher education programs are anchored by four thematic strands – technology, diversity, field experience, and portfolio assessment. These strands are woven throughout the new programs, and the P3T3 project contributed significantly to each. Naturally, the P3T3 project contributed to the technology strand by encouraging faculty to infuse technology throughout courses in the new programs and by helping to develop the technology infrastructure supporting the programs. The P3T3 project supported the diversity and the field experience strands through the development and implementation of technology-enabled distance field experiences, which used video conferencing technology to link pre-service teachers with diverse students in urban and other schools settings at a distance from the Purdue campus. Finally, the P3T3 project developed the infrastructure to support the portfolio strand through the development and

implementation of the Purdue Electronic Portfolio (PEP) system, a large-scale and web-based electronic portfolio system that became a required component of Purdue's teacher education programs in fall 2002.

Project Status

Purdue's P3T3 project was designed to address two main goals:

Goal #1: Faculty will teach pre-service teachers in technology-rich environments, using conceptual technologies (technologies for learning and thinking about complex systems), modeling approaches that future teachers should use to teach their K-12 students.

Goal #2: All teacher education majors will demonstrate fundamental technology competencies, using technology as a tool for teaching/learning, personal productivity, communication with faculty and peers, observation of diversity and exemplary practices, and reflection on practice and the role of technology in practice.

The project established five objectives to meet goal #1 and four objectives to meet goal #2. These are shown below with their status at the end of the project.

Goal #1: Faculty Use of Technology

Objective 1	All teacher education faculty, including graduate teaching assistants and key faculty in the Schools of Science and Liberal Arts, will meet or exceed all ISTE/NCATE foundations in technology competencies for teachers. (GPRA 1.1, 1.2, 1.4, 3.1)
Definition of Success	By the end of year 1 of the grant, 25% of faculty will have engaged in workshop and mentoring network. By the end of year 2, 60%. By the end of year 3, 100%.
Progress	Status: Accomplished. • Nine two-day start-up workshops were offered for faculty. A total of 67 Education faculty members (about 95% of the total) participated as well as 8 adjunct/visiting Education faculty members, 12 faculty members from Liberal Arts and Science, 4 other faculty members, and 15 teaching assistants. • Throughout the project, there were over 800 technology skills workshop attendees. Attendees' ratings of the workshops were: 66% Great, 25% Good, 3% OK, 0% Fair, 0% Poor, and 6% No opinion. • Techie Talks, informal presentations on various technology topics and faculty success stories, faculty mini-grants, and a mentoring and support program for participating faculty members also contributed to faculty development. • At project's end, students reported that: o 96% of faculty are intermediate or proficient in overall technology proficiency. o A high percentage are at the intermediate or proficient level with regard to specific technologies such as General Computer Knowledge and Skills (97%), Internet (93%), Email (99%),

	Word processing (98%), and Presentation software (94%). • Faculty self-report surveys found that: o 94% of faculty rated themselves as intermediate or proficient in overall technology proficiency. o A high percentage of faculty rated themselves intermediate to proficient with regard to specific technologies such as General Computer Knowledge and Skills (100%), Internet (90%), Email (100%), Word processing (100%), and Presentation software (80%) as well as Instructional technology knowledge and use (72%).

Objective 2	Technology will be meaningfully integrated into teacher preparation courses and key courses taken by pre-service teachers in the Schools of Science and Liberal Arts. (GPRA 1.1, 1.4, 3.1)
Definition of Success	By the end of year 1 of the grant, 25% of the courses will have integrated technology. By the end of year 2, 50%. By the end of year 3, 75%.
Progress	Status: Accomplished • 100% of responding faculty claim to use technology in their classes. (Spring 2004 Post Survey) Students report that 99% of their professors use technology in classes. (March 2003 Student Survey) • 85% of faculty report that they have refined the use of technology in their classes as a result of participation in the P3T3 project. (March 2003 Faculty Survey)

Objective 3	The School of Education at Purdue will meet or exceed all CEO Forum StaR Chart institutional standards at the Advanced Level.
Definition of Success	By the end of year 1 of the grant, the SOE will meet or exceed the Early Tech Standards of the StaR Chart. By the end of year 2, it will meet or exceed the Developing Tech Standards. By the end of year 3, the Advanced Tech Standards. (GPRA 1.2, 1.4)
Progress	Status: Partially Accomplished • Most of the StaR Chart indicators at the Advanced Technology level have been achieved. A campus strategic plan, developed in 2001, incorporates technology. The School of Education receives excellent funding support from the campus. Campus facilities are well equipped. Faculty use of technology is rewarded, and technology use is a priority in hiring. The program meets NCATE standards. Faculty development initiatives and technology support meet advanced levels. • Some of the advanced level indicators have not been met. Technology, while well supported in the past, has only partial line item budget support. Further, technology use, while encouraged, is not a required component of student teaching.

Objective 4	Sufficient technological support and resources will be available. (GPRA 1.4)
Definition of Success	A full-time technical curricular support person will be hired. Faculty and students will deem the access and adequacy of the hardware and software satisfactory.
Progress	Status: Accomplished • A full-time technical curricular support person for the P3T3 project was hired in the fall of 2000. The School of Education created a new database administrator line, to handle electronic portfolio implementation, in 2003. • Within the SOE, at least 4 FTE are dedicated to technology support. Faculty and students deem the access to and adequacy of hardware and software to be satisfactory. o 96% of the faculty report that technical support is available within 24 hours. (2004 Post Survey) o 92% of faculty members have used technical support staff for training in the past year. (2004 Post Survey) o 83% of the faculty report the School of Education has sufficient facilities and hardware to allow them to use technology as they would like. (March 2003 Faculty Survey) o 90% of the faculty report the SOE has sufficient software to allow them to use technology, as they would like. (March 2003 Faculty Survey) o 82% of the faculty report the SOE has sufficient technical support to allow them to use technology, as they would like. (March 2002 Faculty Survey) o 95% of the students say they have sufficient access to facilities, hardware, and software on the Purdue campus to support their technology needs. (March 2002 Student Survey)

Objective 5	Technology resources will be expanded through continual development of innovative school-based technology. (GPRA 1.4)
Definition of Success	By the end of year 1 of the grant, a mobile computer "lab" will be established. By the end of year 2, a flexible classroom space will be developed. By the end of year 3, at least one additional classroom will be converted to accommodate new student uses of technology.
Progress	Status: Accomplished • A mobile "lab" of wireless laptop computers and a cart was acquired and deployed during year 1. Project partner Intel donated additional laptops, as well as desktop machines, for the School's Technology Resources Center. Faculty and students regularly use these machines. • A new flexible classroom space was developed as part of the TCCT (Twenty-First Century Conceptual Tools) Center within the School of Education. Also, wiring within the building was upgraded to accommodate bandwidth intensive applications such

	as video conferencing. • An additional classroom space, used for multimedia development and support, was remodeled in 2004.

Goal #2: Student Use of Technology

Objective 1	All graduating students will meet or exceed the ISTE/NCATE foundations in technology competencies for teachers by the end of the project. (GPRA 1.3, 2.1)
Definition of Success	By the end of year 2 of the grant, students will be competent in basic computer/technology operations and concepts. They will apply tools to enhance their own professional growth and productivity. Students will apply computer and related technologies to support instruction.
Progress	Status: Accomplished • Students and faculty agree that student competency and use of technology is high. (2004 Post Survey, March 2003 Student Survey, March 2003 Faculty Survey) • Faculty report that: o 95% of students are intermediate or proficient in General Computer Knowledge and Skills (2004 Post Survey) o A high percentage of students rate themselves at the intermediate or proficient level with regard to specific technologies such as Internet (96%), email (94%), word processing (91%), and presentation skills (75%). o 67% of students are at an intermediate or proficient level in their Instructional Technology Knowledge and Use. o Overall, faculty rated 84% of the students as intermediate or proficient. • Students self-report surveys found that o 97% of students rated themselves as intermediate or proficient in General Computer Knowledge and Skills o A high percentage are at the intermediate or proficient level with regard to specific technologies such as Internet (90%), email (96%), word processing (98%), presentation software (89%), and spreadsheets (82%). o 67% of students ranked themselves intermediate or proficient in Instructional Technology Knowledge and Use o Overall, 94% of responding students rate their technology proficiency as intermediate to proficient.

Objective 2	The Purdue School of Education will create a model web-based infrastructure for portfolio creation, maintenance, flexible manipulation, and use in the teacher education programs. Throughout their program of study, students will construct, build upon, and use electronic portfolios as part of their preparation to become teachers. (GPRA 1.3, 1.4, 2.1)
Definition of	The web-based infrastructure will be complete by the end of year 1 of

Success	the grant. Upon completion of EDCI 270, all students will have begun a portfolio and will have met all criteria upon graduation. At checkpoints in unit assessment, students will evidence reflection on evolving teaching.
Progress	Status: Accomplished • The web-based infrastructure was established at the end of year 1 and was piloted during the 2001-2002 academic year. Effective for students entering teacher education after the fall of 2002, all teacher education majors are required to use the electronic portfolio system.

Objective 3	In cooperation with partner K-12 schools, students' practical experiences will be enhanced through the capability to observe diverse school sites via electronic access. (GPRA 1.4, 3.2)
Definition of Success	By the end of year 1 of the grant, at least 1 diverse experience will be integrated into courses in blocks one and two. By the end of year 2, at least 1 additional experience in blocks three and four. By then end of year 3, at least 1 additional experience in blocks five and six.
Progress	Status: Accomplished • Since year one of the grant, students in one section of a Block I course have participated in a virtual field experience using video conferencing to connect with diverse students in East Chicago. Multiple additional experiences involving video conferencing linkages with partner schools in Crawfordsville, Lafayette, and Indianapolis have been implemented in various courses. In 2004, remote observations of student teachers were also pilot tested.

Objective 4	In cooperation with partner K-12 schools, students' practical experiences will be enhanced through the capability to observe sites featuring technology-proficient in-service teachers and communication among students, faculty, and K-12 partners will be enhanced by using technology (two-way interactive video, multimedia cases, and the Internet). (GPRA 1.1, 1.2, 3.2)
Definition of Success	By the end of year 1 of the grant, a web-based community linking all consortium partners and all teacher education students will be established. By the end of the project, desktop video conferencing will be piloted with at least three school sites involving teachers and university supervisors.
Progress	Status: Partially Accomplished • Roughly four to five classes each semester have participated in two-way video conferencing since the inception of the grant. • A web-based community linking all consortium partners and teacher education students was not established.

Project Evaluation

Evaluative data for the P3T3 grant were collected over the life of the grant through a variety of means including surveys, interviews, document analysis, and review of e-portfolios. The project evaluator was Courtney Brown, Dominion Research. Complete copies of evaluation reports are available on the project's website (http://p3t3.soe.purdue.edu) and the CD-ROM accompanying this report. The major methods of evaluation are described below.

An initial faculty survey was administered before significant grant work began in August 2000 to gather baseline data. The survey was given to faculty (59 total) and teaching assistants (44 total) attending a fall school meeting. In order to survey the students (i.e. pre-service teachers), a stratified random sample of classes was chosen in September 2000. Surveys were administered in these classes, and a total of 307 students completed the survey. The initial survey contained sections on demographics, technology use and comfort, potential barriers, technology integration, field experiences, communication types, and instruction.

Final faculty and student post surveys were administered in spring 2004 at the end of the project's non-funded extension year. The post survey consisted of two parts; the first paralleled the pre survey, and the second was a self/counterpart technology proficiency assessment like those administered via the web in previous years. A total of 50 faculty members completed the faculty survey. In order to survey the students a stratified random sample of 20 classes was selected. Surveys were administered in classes, and a total of 455 undergraduate surveys were completed. While the demographics of respondents varied slightly from the pre survey, responses could be compared by taking the time of year of administration (spring vs. fall) into account.

In years 2 and 3 of the project, students and faculty completed self/counterpart assessments of technology proficiency in nine areas (students rated faculty, faculty rated students; each group rated themselves). This survey was a web-based survey. It was administered to faculty and students in the School of Education at Purdue in March 2002 and then again in March 2003. One survey was specific to faculty and another was specific to students. The faculty in the School of Education and affiliated faculty in the Schools of Science and Liberal Arts were asked to respond to the survey. A total of 39 faculty members completed the survey in 2002 and 40 in 2003. In order to survey the students a stratified random sample of 20 classes was selected. The instructors of those classes were asked to announce the survey and the survey's web address to their classes and encourage the students to respond to the survey. A total of 286 undergraduate students completed the survey in 2002 and 228 in 2003.

In addition to these measures, other forms of evaluation were employed. Faculty completed surveys related to the GPRA indicators in each of the three funded project years. Users of the electronic portfolio were surveyed about the system through a survey embedded within the system itself. Participants in some of the classes that took part in distance field experiences were surveyed about their experiences. Faculty and students were interviewed at various times about the project and their perceptions of it.

In addition, a team of external evaluators completed a 3-day site visit near the end of each of the three years during which the project was funded (June 2001, April 2002, and April 2003). The evaluation team consisted of Allen Glenn, Professor and former Dean of Education at the University of Washington; Rodney Reed, former Dean of

Education at Penn State University; and Elizabeth Rhodes, Director of the Professional Development Training Center at Xavier University of Louisiana. The external evaluation team reviewed the activities of the project and interviewed faculty, students, and others. The team issued an evaluation report at the end of each of their site visits, and these reports are available on the project's website (http://p3t3.soe.purdue.edu) and the CD-ROM accompanying this report.

Outcomes

An estimated 3000 pre-service teachers, 90 university faculty members, and 50 K-12 school personnel were impacted by this project. A number of changes occurred in Purdue's teacher education programs over the life of the grant. Pre-service teachers had increasing opportunities to learn in classrooms outfitted with the most recent technology and from professors who were trained in and used technology. Pre-service teachers began to maintain their work from core classes in an electronic portfolio system where they were able to demonstrate their abilities and proficiencies to their professors and others. Many pre-service teachers were given the opportunity to work with K-12 children outside of the immediate Purdue area through video conferencing.

Survey data show a significant increase in use and abilities of both pre-service teachers and faculty in word processing, spreadsheets, presentation software, digital cameras, video conferencing, and hand-held technology tools. Teacher education students and faculty alike experienced fewer barriers to integrating technology into instructional programs. Faculty used more technology in their teaching and as requirements for courses.

Teacher education students rated faculty more proficient than themselves. However, over the life of the grant students significantly increased their own proficiencies in general computer knowledge, internet, e-mail, databases, presentation software, and overall. In addition they rated their professors as more proficient in general knowledge and the Internet.

In comparing pre-service teacher responses on the initial survey with those on the final survey, several significant differences were noted. Those findings are highlighted below.

Changes Related to Pre-service Teachers

Category	**Significant Findings Concerning Pre-Service Teachers**
Use of Computer Tools/Applications	• Use of Word Processing Increased. • Use of Spreadsheets Increased. • Use of Web Browser Increased. • Use of E-Mail Increased. • Use of Presentation Software Increased. • Use of Digital Cameras Increased. • Use of Hand-Held Technology Tools Increased.
Comfort with Tools/Applications	• Comfort level with Spreadsheets Increased. • Comfort level with Graphics Software Increased. • Comfort level with Presentation Software Increased. • Comfort level with Desktop Multimedia Software *Decreased*. • Comfort level with Digital Cameras Increased.

	• Comfort level with Hand-Held Technology Tools Increased.
Barriers to Technology Use and Integration	• Fewer considered Not Enough Computers a barrier. • Fewer considered Lack of Adequate Technical Support a barrier. • Fewer considered Not Enough Technology-Rich Classrooms a barrier. • Fewer considered No Access to the Necessary Technology at Home a barrier.
Technology Proficiency	• General Computer Knowledge and Skills Increased. • Internet proficiency Increased. • Email proficiency Increased. • Database proficiency Increased. • Presentation software proficiency Increased. • Instructional Technology Knowledge and Use Increased.

The student results show a clear trend toward increased use of and comfort with technology, reduction of perceived barriers to technology integration, and improved proficiency. The only negative finding in the student data was that the comfort level with desktop multimedia software decreased. This is almost certainly the result of a change in the required introductory level educational technology course for teacher education students, which replaced a desktop multimedia assignment with a web assignment.

Faculties from the Schools of Education, Liberal Arts, and Science, among others were given numerous opportunities to attend workshops and presentations where they were shown how to use and incorporate a wide variety of technologies in their teaching, research, and personal lives. Technical support personnel were on hand to work with professors on a one-to-one basis as needed. Some of the School of Education professors were able to link with K-12 schools to show their students diverse classrooms and help teach their students how to work with them. Professors were able to observe their student teachers teaching live without sitting in the classroom. Professors were given the tools, knowledge and abilities to teach their students using current technology.

Faculty impressions of their own proficiency in technology and their students remained stable. Faculty consistently rated their own abilities as proficient to intermediate while rating their students intermediate to introductory.

Changes Related to University Faculty

Category	**Significant Findings Concerning Faculty**
Use of Computer Tools/Applications	• Use of Spreadsheets Increased. • Use of Presentation Software Increased. • Use of Video Conferencing Increased. • Use of Hand-Held Technology Tools Increased. • Use of Databases *Decreased.* • Use of Computer-Based Reference Software *Decreased.*
Comfort with Tools/Applications	• Comfort Level with Word Processing Increased. • Comfort Level with Operating a Computer Increased. • Comfort Level with Databases Increased.

	• Comfort Level with Spreadsheets Increased. • Comfort Level with Presentation Software Increased. • Comfort Level with Computer-Based Reference Software Increased. • Comfort Level with Content Specific Instructional Software *Decreased.* • Comfort Level with Video Digitizer/Digital Video Equipment Increased. • Comfort Level with Hand-Held Technology Tools Increased.
Barriers to Technology Use and Integration	• Fewer considered Not Enough Computers a barrier. • Fewer considered Not Enough Training Opportunities a barrier. • Fewer considered Students do not have Enough Access to Technology on Campus a barrier.
Technology Integration	• More use Presentation Software and Multimedia to Develop Presentations and Demonstrations • More use Video for Preservice Students to Observe K-12 Teachers • More use Technology for Personal Productivity and Professional Enhancement • Faculty used technology in various ways in instruction (89% - personal productivity, 85% - student required web research, 75% - technology strategies to help students learn, 73% - student presentations, 69% - use of web resources, 63% - technology-based assessment and evaluation.

The faculty results, like those for the pre-service teachers, generally show a trend toward increased use of and comfort with technology, reduction of perceived barriers to technology integration, and increased technology integration. A few decreases were observed, such as use of databases and computer-based reference software as well as comfort with content-specific instructional software. These decreases may reflect increasing influence of the web (compared to stand-alone software) and more widespread use of general purposes computer applications, which were stressed in the project. Overall, however, the results show a clear trajectory toward increased faculty and student use of and comfort with various technologies.

Project Performance Measures/GPRA Indicators

The following performance indicators related to the GPRA standards derived from project evaluation data.

GPRA Indicator	**P3T3 Project Evidence**
1.1 Curriculum redesign. The percentage of teacher preparation programs that redesign their curriculum to incorporate best practices in the use of technology in	• 85% of faculty participating in the project reported redesigning curricula to integrate or refine the use of technology in their teacher education courses.

teacher education will increase.	
1.2 Technology-proficient faculty. The percentage of faculty members in teacher preparation programs that effectively use technology in their teaching will increase	• 99% of students in the final year (2004) agreed that faculty members used technology in class compared to only 43% of students in the first year of the project (2000). • Approximately 95% of faculty were rated intermediate to fully proficient with technology by the end of the project according to self-assessments and assessments by students.
1.3 Graduation requirements. The number of teacher preparation programs that will require teacher candidates to demonstrate proficiency in the effective use of technology in teaching and learning will increase.	• In fall 2002, satisfactory completion of electronic portfolio assignments, including those demonstrating technology proficiency, became a required component, necessary for graduation, in Purdue's teacher education programs.
1.4 Learning resources. The percentage of teacher preparation programs that use web-based, multi-media learning resources, course materials and teaching tools will increase.	• Technology-based learning resources are extensively integrated into teacher education courses. According to 2004 survey data: o 85% of faculty require students to use the Web to conduct research. o 75% implement methods and strategies involving technology to help students learn. o 73% require students to use presentation software and multimedia. o 69% use the Web as an online resource for syllabi, lesson plans, and course material. o 63% use technology for assessment and evaluation.
2.1 Technology-proficient new teachers. The percentage of new teachers who are proficient in using technology and integrating technology into instructional practices will increase.	• Approximately 96% of students were rated intermediate to fully proficient with technology by the end of the project according to self-assessments and assessments by faculty. • Students showed increased use of and comfort with a number of technologies (e.g., digital cameras, spreadsheets, presentation software) from the beginning of the project (2000) until the end (2004).
3.1 Sustained program activities. At least 35 percent of program consortia members will continue to implement reform in pre-service teacher training for at least two years following the	• Plans are in place for sustaining program activities after the end of the grant. (See below.)

termination of federal funding.	
3.2 Inter-disciplinary partnerships. The percentage of teacher preparation programs that communicate, collaborate and partner together with schools of arts and sciences on a regular and formal basis will increase.	• The project established and maintained partnerships with four K-12 school districts and with the School of Liberal Arts and the School of Science at Purdue.
3.3 K-16 partnerships. The percentage of teacher preparation programs that communicate, collaborate, and partner together with the K-12 community on a regular and formal basis will increase.	• The project established partnerships with K-12 school districts that are expected to continue.

Sustainability

With respect to the three main activities of the project – faculty development and mentoring, development of an electronic portfolio system, and technology-enabled distance field experiences – the following measures have been taken to sustain project initiatives.

- Faculty Development
  - Opportunities for continued faculty development will be provided by the Customer Education group of ITaP (Information Technology at Purdue), the campus-wide information technology support service at the university.
  - Support within the School of Education will be provided by the School of Education's Office of Information Technology, which currently has four full-time support personnel.
  - Use of technology within teacher education courses is now established as part of the curriculum and will continue as part of normal operations.
- Electronic Portfolio
  - Following an NCATE accreditation visit in spring 2004, it became clear that the PEP (Purdue Electronic Portfolio) system would require significant expansion in order to meet growing data aggregation needs related to accreditation. Because federal funding for support of the system was ending, a decision was made to transition from PEP to a commercial electronic portfolio system called Taskstream. Beginning in fall 2004, the teacher education programs will require the use of Taskstream, and the PEP system will be retired (after at least a one year transition period to allow current users to remove materials from PEP). The new system will ensure that the electronic portfolio aspects of the project will continue into the foreseeable future.
  - In order to provide continued support for electronic portfolios, the School of Education hired a full-time database administrator in 2003 to assist with the electronic portfolio needs of the teacher education programs.
- Technology-Enabled Distance Field Experiences
  - Equipment for technology-enabled field experiences is now in place both at Purdue and in partner schools. As a result, opportunities for distance field experiences between Purdue and K-12 schools are expected to continue.

- The School of Education's Office of Information Technology will provide on-going technical support for video conferencing connections between teacher education courses and K-12 schools.

Lessons Learned

Each of the three main components of the project – faculty development and mentoring, development and implementation of an electronic portfolio system, and technology-enabled distance field experiences – yielded lessons that may be of interest to others. Key lessons learned are presented here by category.

- Faculty Development
  - Adequate long-term support, such as the provision of personalized one-on-one assistance, is a critically important factor in helping busy faculty members to integrate technology in their teaching. We found that our system of support, in which knowledgeable graduate students worked one-on-one with faculty, was very effective.
  - While skills development is an important aspect of faculty development, the development of technology skills must take place within the context of meeting specific instructional needs/interests of the faculty members in order for it to be effective and to sustain faculty involvement. Requiring participating faculty members to develop a personal technology integration goal and plan was a useful way to help faculty members to focus on their own instructional needs and the role of technology in helping to meet those needs.
  - Linking the provision of resources to specific faculty proposals with accountability is an effective way to create "buy-in" and so support faculty efforts to integrate technology. We found that our faculty mini-grant program, implemented in the latter half of the project, was a better approach than providing resources with "no strings attached" to all participants.
  - While we originally planned to develop a web-based community to link all participating faculty members and foster dialogue about technology integration, this idea was unsuccessful. Busy faculty members were not interested in taking the time to interact online. Informal small group interactions and Techie Talk sessions were more useful in building community.
- Electronic Portfolio
  - Electronic portfolios that rely on databases, such as the system Purdue created, offer significant benefits including the ability to: store student work in multiple media, link to standards and other outside sources, provide flexible access to the information, and aggregate data for program improvement and accreditation purposes.
  - Institutions today should probably be dissuaded from trying to develop their own electronic portfolio systems as we did in this project. The development effort was complex, time-consuming, and fairly costly. At the outset of our project, there were few available electronic portfolio options, and so developing our own system was a reasonable goal. Today, however, a number of systems have been developed and are commercially available. Indeed, we have chosen to transition from our own system to one of the commercial systems now available. With

capable systems now available, there is little rationale for institutions to expend resources to "growing their own."
    - While technical issues are a concern, in our experience the most significant issues with electronic portfolio implementation have to do with curriculum integration. Our biggest problems came with respect to articulating the role of the electronic portfolio in courses and across the teacher education program, obtaining "buy in" from faculty and students, and establishing mechanisms for ensuring that candidates' electronic portfolios satisfied all relevant standards.
- Technology-Enabled Distance Field Experiences
    - Use of two-way Internet-based video to connect colleges of education with K-12 classrooms is a viable option for certain types of field experiences for pre-service teachers (e.g., exposing pre-service teachers to examples of classroom diversity not readily available for traditional field placements).
    - Technology-enabled field experiences are *not* a replacement for traditional field experiences, but they do offer a means to augment the experiences of pre-service teachers in ways that otherwise might not be possible.
    - Various models for using two-way video connections to link teacher education classes with K-12 classrooms can be successful including short-term observational connections, practice tutoring/teaching sessions, long-term collaborative interactions, and opportunities for remote student teacher observation.
    - Internet firewalls in K-12 schools are a significant impediment to establishing Internet-based video connections between colleges of education and K-12 schools. However, with advanced planning and technical support, connections can be established and maintained without great difficulty.
    - Internet-based video conferencing technology (e.g., Polycom video conferencing equipment) is reliable and provides a relatively high quality connection. However, there are shortcomings for linking colleges of education and K-12 schools including occasional service interruptions due to network traffic/limitations, difficulty viewing details of classroom settings, and difficulty hearing individual students in the classroom.

List of Products

The following major products were produced by the project:

- Purdue Electronic Portfolio (PEP) system (https://eportfolio.soe.purdue.edu) is an electronic portfolio application consisting of active server pages (ASP) technology linked to a Microsoft SQL Server database running on a Windows server. While Purdue plans to transition to another system in 2004-05, the code for the PEP system will be made available to any other institution that might wish to use it.
- A project website with a variety of resources was developed and remains available at: http://p3t3.soe.purdue.edu.
- A number of papers and presentations were produced as part of the dissemination efforts related to the project. These are available on the project's website as well as the CD-ROM accompanying this report.
- Products about the P3T3 project were also produced by others.

- The national PT3 website twice featured stories about Purdue's efforts, including faculty development (http://www.pt3.org/stories/purdue.html) and distance field experiences (http://www.pt3.org/stories/remote_field.html).
- Videos about the project, available on the web, were produced by Soundprint Media for WHRO-TV's *Education Now!* (formerly *PT3 Now!*) video series. These videos feature segments about our distance field experiences (http://teachingnow.org/watchTV.php?id=30) and electronic portfolio system (http://teachingnow.org/watchTV.php?id=38).

Collaborative Exchange

Purdue University hosted a Collaborative Exchange for its project on April 3-4, 2002. The Collaborative Exchange team consisted on Howard Poole from Western Michigan University, Nancy Wentworth and Rodney Earle from Brigham Young University, and Michael Brorby from Rice University. Members of the Purdue team participated in Collaborative Exchange visits at Western Michigan University, Utah State University, and the University of Puerto Rico - Rio Piedras. Collaborative exchange visits offered a valuable opportunity for sharing perspectives with other grantees, and, while they did not lead to significant changes in our own project, they did yield many suggestions and ideas that were incorporated into our project.

Partnership List

All project partners participated throughout the complete term of the project; no partners dropped out and none were added. Within Purdue University, project partners included the School of Education (the lead organization), the School of Liberal Arts, the School of Science, and Information Technology at Purdue (ITaP), particularly the Multimedia Instructional Development Center. Partner K-12 school districts were the School City of East Chicago, Crawfordsville Community Schools, Lafayette School Corporation, and Indianapolis Lawrence Township Schools. Partner educational organizations included the Center for Interactive Learning and Collaboration (CILC), the North Central Regional Technology in Education Consortium (NCRTEC), and the Indiana Department of Education. Corporate partners were Apple Computer and Intel Corporation. All contributed substantively to the success of the project.

OMB No. 1890-0004
Exp. Date: 6/30/2005

U.S. Department of Education
Grant Performance Report
Cover Sheet

See Block 5 on the Grant Award Notification.

1.) PR/Award No

P342A000075

Enter the same title as on the approved application.

2.) Project Title

P3T3: PURDUE PROGRAM FOR PREPARING TOMORROW'S TEACHERS TO USE TECHNOLOGY

Repeat from Block 1 on Grant Award Notification. If address has changed, provide the current address.

3.) Recipient Information

Name: PURDUE UNIVERSITY

Address: BRNG 1442

City: WEST LAFAYETTE State: IN Zip+4: 47907-1442

Provide the name of the project director or the contact person who is most familiar with the content of the performance report.

4.) Contact Person

Name: JAMES D LEHMAN
Title: PROJECT DIRECTOR
Telephone Number: 765-494-5670
Fax Number: 765-496-1622
E-mail Address: lehman@purdue.edu

Include the interval for the information requested in the performance reporting period. See instructions on page 2 for details.

5.) Performance Reporting Period

06/01/00 - 05/31/04 (mm/dd/yy)

Report actual budget expenditures for the above performance reporting period. See instructions on page 2 for details.

6.) Cumulative Expenditures

	Federal $	Non-Federal $
Current Budget Period	1,062,108.00	1,187,083.74
Previous Budget Period		
Negotiated Indirect Cost Rate: 8% (allowed by sponsor)		
Exp. Date: 05/31/04		

If applicable, see instructions on page 2 for details on annual IRB approval (Please circle one).

7.) Annual Certification of Institutional Review Board (IRB) Approval

Yes ____	No ____	NA _X__

Authorized Representative:

To the best of my knowledge and belief, all data in this performance report are true and correct.

Name (typed or printed):	Title:
Signature:	Date: