Program for Educational Transformation Through Technology

University of Washington

2003 Prospectus
This CD contains examples and additional information about PETTT’s efforts at the University of Washington. Wherever you see a CD icon next to a project in this prospectus, you will find more information about that project on the CD. Numbers next to icons match numbered video clips on the CD.

For more information regarding PETTT projects, including descriptions, publications, presentations, and campus partners, please see http://depts.washington.edu/pettt/projects.

PETTT is made possible by funding from a University Initiatives Fund award encouraging and supporting interdisciplinary, collaborative, and transformative educational programs that strengthen the greater University of Washington community.

For more information about the UIF, please see: http://www.washington.edu/uif
PETTT is transforming the learning experience at the University of Washington by accelerating our understanding of how technology enhances the process of preserving, advancing, and disseminating knowledge.

“Arthritis Source is an outstanding example of the University reaching out and sharing information throughout the state of Washington and beyond. The knowledge management infrastructure developed for this Web site has the potential to benefit the access and transfer of knowledge in many other domains.”

—Price Taylor, President, Society of Information Managers

“We used the simulation technology [Virtual Case] to actively engage in real world problems. This gave me an opportunity to learn things that I never encountered in my other classes, which were based on textbooks and lectures.”

—Brittany Goodnight, International Studies Major

“Video Traces helps us to overcome one of the biggest challenges in teaching dance—assessing a piece of art that only exists in a brief moment in time in an objective manner. Using Video Traces to record their dance and my commentary allows students to see, talk and reflect on their own work in a way that helps make them more responsible future artists.”

—Maria Simpson, Faculty, Dance

“Unlike a typical class where the focus is on reading about politics and taking tests, with LEGSIM [Legislative Simulation Software] the focus is on the students and what they want out of the political process by enabling them to experience complex political action—action that gets so intense, they take it personally.”

—John Wilkerson, Faculty, Political Science
Executive Summary

As a University Initiatives Fund program, PETTT’s purpose is to build the knowledge work of the University of Washington by inspiring innovation and rigorous evaluation of new technology-based educational strategies. This prospectus will demonstrate PETTT’s effectiveness in the development of progressive educational strategies and its role in creating an environment of educational entrepreneurism at the University.

PETTT’s multidisciplinary team studies the use of technology-based strategies in the classroom, assessing their contribution to effective teaching and learning. Through active partnerships with UW faculty, PETTT’s research informs the design and implementation of these strategies. The products of PETTT’s work are shared with faculty and students, creating communities dedicated to the progressive optimization of education. Here is where true innovation takes place—not in the rote implementation of technologies—but in open discourse among educators, students and researchers who, together, can assess how technology can be best used in service to education.

Five unique dimensions characterize the activities of the Program:

- **Rather than making assumptions regarding the needs of teachers and learners, PETTT is actively researching these needs and developing practical and effective responses to them.**
- **Recognizing that education needs to be dynamic and engaging, PETTT partners with educators in enhancing educational innovation.**
- **Understanding that UW has brilliant educators on campus, PETTT is building partnerships among these individuals to leverage their interests in technology-based educational strategies.**
- **Acknowledging that technology adoption is costly in both time and resources, PETTT is investigating which strategies are most effective and efficient.**
- **Observing a steep gradient in the use of technology-based educational strategies among individuals, PETTT is driving the dissemination of effective strategies to teachers and learners across campus and around the world.**
Without PETTT, these efforts would have been relatively isolated in individual, unconnected projects. With the catalytic effect of PETTT, the knowledge work of the UW is recognized as some of the best in the world. The need for innovation and assessment of technology-based educational strategies at the UW will never be finished – as new opportunities arise so will the need for their rigorous evaluation against the educational objectives of faculty and students. Education will continue to be transformed by the application of technologies that have been thoughtfully evaluated and put into practice to the benefit of teachers and learners.

"The strategic plan for the College of Education includes a specific commitment to infuse technology through all programs in order to model uses and practices that students can learn and effectively apply in their respective fields. This in turn requires helping faculty to more fully integrate technology in their own teaching and research. To fulfill this commitment over the next several years, the College looks forward to continuing to draw upon the excellent assistance provided by the UIF-funded PETT.”

-Pat Wasley, Dean, College of Education
The University of Washington has a proud tradition of innovation

This tradition is what draws brilliant researchers and educators from around the world to this campus; it is, in part, what enables undergraduate and graduate students to achieve an excellence that well serves the state, the region and the nation. This culture of innovation is one of the many things that helps to make the University of Washington great.

As part of the core mission of the University, the preservation, advancement and dissemination of knowledge is also subject to innovation—especially as technology continues to play a larger role in the classroom. Enabling and encouraging such innovation is a major focus of PETTT at the University of Washington.

Since its inception, PETTT has been enhancing the effectiveness of teaching and learning by studying educational tools and strategies—coupling the UW’s tradition of world-class research with the science of learning.

PETTT helps establish effective teaching and learning with technology through research, design and dissemination techniques. By conducting research in the classroom, PETTT can observe and assess how technology can influence learning. PETTT will then use that knowledge to design or redesign a tool so that it better serves its purpose. Once re-introduced into the classroom, it is studied again, with the results disseminated to educators.

More than researching and designing learning technologies and strategies, PETTT brings together people who are interested in education and technology. This type of collaboration helps further UW’s tradition of innovation. PETTT continues that work by:

- identifying and responding to the needs of teachers and learners
- using research to identify effective educational strategies and technologies
- enhancing innovative teaching and learning with technology
- building communities among people interested in education and technology
- sharing knowledge work of the University of Washington with the world
How PETTT promotes technological innovation and collaboration in the service of learning exemplifies the University of Washington’s dedication to fostering imaginative, innovative thinking. By reaching out to the university community, PETTT has come to understand the needs of teachers and learners. It was an innovative step for the University to enable such a program; PETTT is unlikely to have emerged elsewhere.

The University of Washington will continue to innovate, with an eye to the future, redefining and transforming the educational experience. PETTT, too, continues to look to the future, ensuring that learning technologies effectively and efficiently do what they are intended to do—help teachers teach and learners learn.

**PETTT is identifying and responding to the needs of teachers and learners**

Educational uses of technology continue to grow on campuses throughout the country. However, how such technology is actually used—and how faculty and students expect it to be used—is relatively unstudied. To that point, Dr. Roy Pea, Professor of Education at Stanford University, noted at a PETTT Symposium that “the pace of technology outstrips what we know what to do with it.”

As technology changes the way teachers teach and learners learn, PETTT researchers—through classroom research, consultations, surveys, and focus groups—are learning precisely what technology uses and expectations exist at the University of Washington. PETTT turns these findings into public recommendations, helping educators find appropriate technological solutions that fully engage their students’ skills, interests, and abilities.
The initiation of the PETTT program has encouraged the development of new ways to use technology to enhance student learning. It is imperative that these programs be allowed to grow and adapt to the changing needs of the students and faculty, since the continuing efforts of these programs will ensure our continued leadership role in the use of technology in teaching and learning.

—The UW College of Arts and Sciences Report on Enhancing Student Learning
"We need more people who really are experts, not just in the
computers and the software, but in the kind of academic
applications and problems that we deal with as opposed to
industry or private business."

-UW Faculty Member
How does PETTT listen to learners at the University of Washington? At its most basic, few things summarize PETTT's mission at the University of Washington more succinctly than **Listening to the Learner**, a first-of-its-kind study initiated in autumn quarter, 2000, to assess the uses and perceptions of educational technology at the University of Washington.

The study surveyed 3,000 students and 3,000 faculty members, followed up by focus groups with 100 individuals. The comprehensive study had several goals: to articulate student and faculty expectations of technology; to identify the barriers to student and faculty use of technology; to help instructors effectively integrate technology into curricula; and to inform the process of educational technology design and development.

The data confirms that, when it comes to reconciling the technological needs of both student and teacher, there are challenges to be surmounted. Students expect the use and instruction of technology in both academic and non-academic settings, while more than half the faculty believe they do not have the time to implement technology in the classroom.

Faculty members recognize that students want technology integrated into their educational experience. One of the greatest barriers to technology adoption, however, is how faculty perceive their skills in using educational technology—and the fear that an inevitable change in the use of technology will leave them behind.

**How does PETTT respond to what it hears?** PETTT publishes results from studies like Listening to the Learner in reports to the UW community and in peer-reviewed, scholarly journals. PETTT also communicates faculty and student needs directly to technology designers and developers at the UW, such as the Catalyst group and Computing & Communications. PETTT recommendations to these groups are making educational technologies easier and less time-consuming for first-time users, while improving the quality and effectiveness of existing instructional tools.

Listening to the Learner data has been shared with Catalyst, for instance, to help guide the
PETTT is identifying and responding to the needs of teachers and learners

development and revision of their online tools. One of the most vivid examples is MyUWClass, a comprehensive tool for faculty to create, organize and disseminate course information. PETTT researchers collaborated with Catalyst to help build on the idea, creating a more complete course planning tool. MyUWClass will address students’ desires to have more course materials online, and faculty needs for easy-to-use course management technology. The tool will be a fully-integrated course planner, class list and grade book, Web development tool, and evaluation and assessment resource.

Faculty also emphasized the importance of learning about technologies in a manner that does not divorce the art of teaching from technical training. “It seems like somebody who can talk very fluently about technology but not remember what our goals are,” says one faculty focus group participant, “is not going to help us in the same way.” From this idea, PETTT helped Catalyst improve its consultation service. The service guides faculty in articulating their goals while providing technical assistance with the educational technologies they use in the classroom. PETTT has even created online tutorials for the Catalyst Web site that address instructional and technical concerns together to promote effective teaching with technology.

"Catalyst was always focused on developing tools that were based on the suggestions of some of the most innovative teachers on campus. From these ideas, we created tools that could be used in a variety of educational settings. Once a tool was released, we were not always able to observe the way that instructors were using them in their classes. The creation of PETTT gave us the ability to study our tools in real classroom settings, and use their recommendations to refine the tools and provide ‘best practices’ for instructors.”

—Mark Farrelly, Outreach and Special Projects Coordinator for Catalyst
PETTT is using research to identify effective educational strategies and technologies

To better understand how PETTT researches and develops educational technologies at the UW, it is helpful to look at the four basic phases of PETTT research through the lens of one of its projects, the Arthritis Source. The Arthritis Source Web site, originally created in 1995, has become an essential tool for PETTT researchers to understand how Web sites can be redesigned to better serve as learning technologies for use both inside and outside the academic arena.

1. **PETTT performs studies in real settings** – PETTT met with UW faculty associated with the Arthritis Source to learn the intended uses of the tool. PETTT then observed how individuals actually used the tool and surveyed users to determine their preferences for obtaining health information and resources.

2. **PETTT research informs the design of tools and strategies** – PETTT used what it learned not only to improve the Arthritis Source, but also to determine a framework for finding and using Web-based information effectively. These findings led to the creation of a generalizable tool PETTT calls the Knowledge Management System.

3. **PETTT helps instructors integrate new tools** – Searching the UW, PETTT identified programs where the Knowledge Management System might apply. PETTT has since been working with instructors from those programs to incorporate the tool into their varied teaching strategies.

4. **PETTT studies how the new tools affect learning and learners** – Right now, PETTT is studying how the Knowledge Management System improves learning and affords instructors new ways of engaging their students. The research cycle begins again.

Given that disciplines have different vocabularies, conceptual knowledge, and methods of inquiry, PETTT studies learning environments as a whole—how teachers, students, curriculum and technology interact and have an impact on each other. PETTT uses what it learns in real classrooms to develop educational...
tools and design recommendations that speak in the many languages and knowledge areas of the UW community.

**How does PETTT research enable the redesign of learning technologies?** PETTT’s research philosophy is rooted in the idea that success depends on continuous evaluation and improvement of learning technologies. PETTT researchers redesigned the [Arthritis Source](#) Web site in July of 2001, building upon studies of users and literature research to learn what patients want when they seek health information on the Internet.

The improved site contains educational articles composed of ordered questions and prompts—the Knowledge Management System. These prompts guide authors (in this case, doctors from the UW Orthopaedics Department) through the process of creating content. The result is a Web site that improves the faculty’s ability to answer questions that patients usually have and better meet patients’ needs.

The use of templates also enables learners-a-large to become more active participants in their own health management—something PETTT researchers learned patients want. Templates organize the site’s information in a manner that most closely matches patient needs by enabling the learner to search the site in a question-and-answer style, using everyday language.

[Arthritis Source Web site: Average daily visits per month](#)
Transforming Web based Patient Education:
An example of a patient interacting with the "Ask" function of Arthritis Source Web site:

At 8:26 am earlier this month, the user asked:

"my husbands leg bone below knee is splinering and knee has moved over it, is there a surgery to save his leg"

The user then browsed the Web-based articles and at 9:22 am re-stated the question:

"approximately 6inches below knee cap the long bone is spintering is there a surgery that can cover this and help support the leg bone"

The user again browsed the Web-based articles and at 10:01 am re-stated the question:

"can a femur tibia splintering of the bone be surgically be repaired ?"

http://www.orthop.washington.edu/search

"Thanks for the information. I have used your Web site to gain information and to prepare me to talk to my doctors...I was able to become a participant in the process and not just a patient with a problem.”

- Arthritis patient
Visits to the redesigned Arthritis Source Web site are consistently high and continue to rise. Unsolicited e-mails from users thanking the site managers have increased in number. The value of the improved site can be seen in the words of one Arthritis Source visitor: “I have used your Web site to gain information and to prepare me to talk to my doctors about my new experiences with joint roughness. I was able to become a participant in the process and not just a patient with a problem.”

Another PETTT project sharing the building blocks of the Arthritis Source framework is the eMedicine personal health information management system. Through Arthritis Source studies, PETTT researchers know that patients want to be more active participants in managing their health. The premise behind the eMedicine framework is similar to Arthritis Source—establish a set of templates that direct patients to compile a personal health profile that contains family medical history, current medications, and other medical background.

The eMedicine system will improve the cost efficiency and quality of the interactions between caregivers and patients by establishing an online personal health history that a patient retains and updates. When the patient needs a medical consultation, their request and profile are sent online to their care provider and matched with the appropriate specialist. The eMedicine system will ultimately be used to implement the UW’s emerging eHealth strategy.

One of the University of Washington’s award-winning, effective strategies for integrating technology into the classroom is the Catalyst Toolbox—ensuring that UW faculty have the technological strategies and support they need. For Catalyst’s many successes, there remains room for growth. Catalyst developers simply do not have the resources to follow-up on the tools they have created, ensuring that they are being used effectively and efficiently in the classroom.

PETTT researchers, in partnership with Catalyst, have been able to provide essential support in the design and redesign of Catalyst tools. This support has come in two major areas: research (collecting and interpreting data that helps developers design or redesign a tool so that it better serves its users) and pedagogical support (by helping designers create a tool so that it addresses specific issues in the classroom).
**VirtualCase**, for instance, is one Catalyst tool for which PETTT has provided many levels of support. Based on a model of problem-based learning that is widely used in medical education, VirtualCase allows student groups to make a series of case-related decisions that affect what they do online. The tool also facilitates communication and file-sharing. After Catalyst released VirtualCase to the UW community, PETTT discovered that instructors from a variety of disciplines were using the tool in creative, unpredicted ways.

PETTT research is now taking place in real classrooms to improve the tool across settings. These multidisciplinary studies include, among others: Law, simulating legal process; Public Health, posting and presenting student research on open-ended problem-based assignments; Education, sharing real stories of K-12 teachers through a graduate student’s research; and, Technical Communication, improving analytic discussion around case studies.

One of the unanticipated ways in which VirtualCase has been used by UW faculty is for role-playing simulations. PETTT made an in-depth study of such a simulation in political science education by examining how VirtualCase was built into a course taught by International Studies Lecturer Ken Lawson.

Students in Ken Lawson’s class worked in small groups, each representing a nation or international organization. Students were asked to identify issues of interest to their group, to propose solutions to those issues, and to negotiate agreements about policy initiatives. PETTT consulted with the instructor, observed classes, interviewed students, and administered a survey to students. As a result of the research, PETTT created design recommendations that will help VirtualCase developers redesign the tool to better support how the tool is used in real settings.

In Technical Communication, Professor Mark Haselkorn wanted to improve his students’ abilities in analyzing complex case studies. PETTT met with Professor Haselkorn to get a clear understanding of his goals and determine how to use VirtualCase in a way that best fit those goals. PETTT then observed how Professor Haselkorn’s students followed his assignment. Using VirtualCase, students became involved in a complex organizational problem, analyzing the case from an employee’s perspective and writing their reports. Students also used a group messaging area, seeded with online questions from the instructor, to discuss the salient issues of the case.

From studying Haselkorn’s course, PETTT discovered that VirtualCase needed improvement in supporting complex scenario descriptions. PETTT also learned that instructors may want more options for playing different types of roles in online group discussions. With data in hand, PETTT researchers have been
“Using VirtualCase is what made the simulation an effective teaching tool. I can’t think of another way in which the international community could be simulated in an effective and realistic way that allowed for communication that was convenient and continuous.”

—Student in Ken Lawson’s international political economy class
PETTT is using research to identify effective educational strategies and technologies meeting with Catalyst to make these enhancements to VirtualCase.

PETTT works with faculty like Ken Lawson and Mark Haselkorn to determine how VirtualCase can be used effectively for different purposes—to enable problem-based learning, collaborative decision-making, case study analysis. PETTT also continues to work with Catalyst developers, revising the tool on an ongoing basis. PETTT’s recommendations become revisions to the Catalyst tools, and those revised tools are studied anew by PETTT. These issues are being addressed through a direct, ongoing relationship between PETTT and Catalyst staff.

**How does PETTT use research to inform strategies for using learning technologies?** Much of PETTT’s work is focused on improving strategies for effectively incorporating learning technologies in educational environments. Strategies PETTT studies include: integrating tools with the curriculum, developing guidelines for working with new technologies in the classroom, presenting learning technologies to students, ensuring technologies help students meet learning goals. PETTT’s collaboration with Catalyst and the Center for Instructional Development and Research (CIDR) in the development of EPost is a good example of how research can influence the strategic use of a learning technology.

**EPost** is a tool that enables students to post questions, comments and reflections on the Web, to be viewed by the entire class. Allowing an open forum for students to discuss classroom lectures is not, in itself, an effective use of the tool—Instructors must provide structure. CIDR and Catalyst worked together to gather feedback from more than 500 students to determine how best EPost could be used to foster and monitor learning. One result of the research was a teaching guide, developed by a team of CIDR staff in consultation with PETTT and Catalyst, to help faculty consider instructional issues related to using EPost. The guide also describes best practices for online discussions, including methods for designing tasks that integrate course readings and techniques to assess student learning in online discussions. PETTT has enabled further collaborations of this type
by creating a position to serve as a liaison among Catalyst developers, CIDR instructional consultants, and PETTT researchers.

Similarly, Portfolio is a recently developed Catalyst tool that is designed to teach students about themselves by encouraging reflective thought. The tool helps students keep a digital record of their work—papers, artwork, research data, projects—and publish it on the Web. It is a curricula vitae, so to speak, of a students’ collegiate career.

To ensure that this tool would be successful, PETTT researchers drew from existing research on paper portfolios to develop a study on electronic portfolios. The study examined how Portfolio might prompt students to reflect on their coursework and UW experiences. During the 2002 autumn quarter, nearly 4,000 participants in the UW Freshman Interest Group (FIG) program and 162 FIG leaders were introduced to Portfolio. As part of their General Studies course, FIG's were taught how to use the tool, and then asked to use it to address a social issue discussed in seminar. Following the series of prompts crafted by PETTT researchers, each student then built a portfolio to address the issue. The results on the tool's use were promising and have led PETTT to a next iteration of studies on using electronic portfolios effectively in the classroom.

Following its redesign through early PETTT research, the Arthritis Source framework, or Knowledge Management System, proved so flexible that PETTT was able to adapt it for use in several other projects, including LawforWa.org (Council on Public Legal Education), the Center for Engineering Learning and Teaching (CELT) Database, and the College of Architecture and Urban Planning’s Design/Build Database.

PETTT’s work has helped the UW English Department’s Digital Tools for Study Abroad Program adapt this same framework to create an innovative teaching opportunity using online writing activities. Shawn Wong, former Chair of the English Department and Director of the program, was interested in developing a new model for teaching student writing. PETTT saw that the Knowledge Management System might be adapted to work with the instructor’s assignments and began working with Professor Wong.

In the summer of 2002, PETTT interviewed instructors and study abroad students to uncover their needs in performing English coursework and their ideas for using technology. PETTT then developed and asked students to try a prototype, or trial version of a tool, based on the Knowledge Management System.
As a result of the needs assessment and trial study, PETTT and the Digital Tools for Study Abroad Program developed an innovative instructional model: when traveling abroad, students write journal entries in response to photos of the places they visit. Once students have made several entries, instructors guide students in linking their writings thematically. Finally, students are asked to find thematic links between their own writing and that of a peer, all using technology originally found in an Arthritis information Web site. This ability to apply redesigned technologies in novel educational scenarios is part of what makes PETTT an effective and efficient UIF program.

In collaboration with the Center for Health Sciences Interprofessional Education and Research, PETTT assisted Pamela Mitchell, Associate Dean for Research in the School of Nursing, in implementing an innovative teaching strategy that adapted the Knowledge Management System for use in an interdisciplinary course. Undergraduate and graduate students in the course learned to create online content accessible broadly across patient populations and, in this way, became part of a larger knowledge-building community. This new use of the Knowledge Management System prompted students to apply their discipline-specific knowledge to their work and reflect within collaborative multidisciplinary teams.

Studying the eHealth Market Research Project on fifty-five academic medical centers, PETTT learned that patient's top three needs in the e-health field are: trustworthy, up-to-date, and easily searchable content; health assessments that are tied to electronic medical records; and use of technology for scheduling appointments. Using this research, PETTT is helping develop a Web-based eHealth strategy that focuses on the patient’s ability to be more fully involved in their wellness—fulfilling the vision of Paul G. Ramsey, Dean of UW’s School of Medicine.

The eHealth strategy hopes to improve how patients access information on the web by combining needed services—scheduling of appointments, the handling of financial transactions, and access medical information. Linking hospital and clinical services to medical information on the Web will attract new patients to the UW and give all patients better access to healthcare resources. PETTT research ensures that this strategy is headed in the right direction.
PETTT is enhancing innovative teaching and learning with technology

Bringing technology into the classroom does not guarantee an improvement in teaching, nor does technology in itself improve student learning. It is the educational needs of teachers and students that should drive the development and application of technology because they will determine how technology is used and to what degree of success. For this reason, PETTT begins every project by asking questions about the components in the educational environment and how they are related to each other.

PETTT interviews instructors to uncover their instructional goals and help them think critically about how they want to integrate technology into their courses. PETTT asks instructors to consider how their teaching and assessment techniques might change when they begin using new technology. Perhaps they would like to use technology to give their students greater access to their lecture materials. Perhaps they would like to make their lectures available outside the classroom, to their colleagues around the world, or revise their curricula to take advantage of new technologies they have developed. UW instructors want to give their students new, diverse opportunities for learning, and for them to be adept at using current and emerging educational technologies. Through one-on-one conversations and instructional improvement studies with UW faculty and students, PETTT has helped these transformations in teaching and learning take place.

How does PETTT help teachers transform their teaching practices? Transformation occurred when Professor Maria Simpson introduced Video Traces into her third-quarter dance composition class in spring 2001. This PETTT-developed technology was conceived by Reed Stevens, Assistant Professor of Cognitive Studies at the UW. With the help of PETTT researchers, Professor Simpson was able to use Video Traces—a tool that can record, replay and annotate digital video—to reflect on her own assessment methods.

From talking with PETTT, Professor Simpson discovered that she did not use the assessment criteria she handed out at the beginning of the quarter. Instead, she found that she tended to assess student skills “intuitively.” Choreographers generally do not have a convenient means to articulate their own process of creating a dance, and to reflect on concepts associated with the dance.
Video Traces addresses this problem by capitalizing upon what digital video affords: an original recording, layered with audio and visual annotations. The tool utilizes a mode of learning Reed Stevens calls “temporal coordination” or “real-time annotation”—the notion that, everyday, in nearly all personal interactions, people gesture and point as well as speak to help convey information.

Christine Goodheart, Director of Community Partnerships in the Office of Educational Partnerships and Learning Technologies, calls Video Traces “a tool that makes learning visible.” In the case of the dance composition class, Professor Simpson was able to record each student’s performance and view it at a later time, recording instructor comments as the video played. That Video Traces is a valuable tool for a student of dance is clear—students can now view recordings of their own performances, an assessment technique used in professional dance.

Professor Simpson’s grading method also improved from her work with Video Traces. “I hear this from students in different ways every year: ‘I’ve never known what the teacher wanted,’” she says. While working with the tool, Simpson found that she could use Video Traces to record and review her evaluations of her student’s work. The result, with help of PETTT researchers, was the implementation of a rubric by which she could measure the learning of her students. “This year they told me that they’ve never received feedback like this before,” Simpson says. “I’ve always given them feedback after every project, but it’s been less clear, less specific.”

Working with annotated video can extend instructors’ uses of their materials to reach a wider audience, as well. In June, 2002, UW Associate Professor Scott Noegel and the Department of Near Eastern Languages and Civilization, in association with the Comparative Religion Program, Jackson School of International Studies, UW Libraries, and PETTT, were awarded a grant to develop the Digital Egypt project. Working to integrate technology into a comprehensive study of Egypt’s history (3000 BC - 1200 AD) and cultural background, the Digital Egypt Project aims to use PowerPoint Presentations, a far-reaching image database of Egyptian subjects, and Web-based broadcasting of supplemental lectures to enhance the learning process for all involved. This ambitious course won the University Curriculum...
"I think there are a lot of things that students can’t be aware of in their compositions, because they haven’t yet developed an outside eye that tells them how they’re relating to the other dancers or whether they are being clear dynamically or spatially. With Video Traces, they would be able to see the difference between doing something one way that’s less successful and another way that’s more successful."

-Maria Simpson,
Faculty, Dance

Students used Video Traces to reflect on and revise their compositions:

"With Video Traces, I wasn’t just sitting back to be entertained the way I would if I watched a videotape—I was constructing changes, formulating my views in words. With Video Traces I’m more able to see lines and structure—there were things about the form of the dance that I could see for the first time."

-Dance student
Development Award and is currently in development for the academic year of 2003-04.

With assistance from PETTT, instructors in the course will be able to make their lectures available as online videos, including notes and bibliographic data, while allowing their students to add comments and hold online discussions directly related to the lecture being viewed. The resulting annotated lecture archive will be integrated into the UW Libraries Content project, a developing multimedia collection of the UW community’s knowledge work, and made available to the public.

Video is being employed even out on the Montlake Cut, where members of the UW women’s rowing team take advantage of Video Traces. Rowers review their practice video annotated by Coach Eleanor McElvaine, and use her video commentary to perfect their technique. From dancing on campus to Egypt and back, PETTT is helping instructors choose appropriate technologies and transform their teaching.

Transformative teaching using technology can also mean creating opportunities for students to experience real life, without leaving the classroom. With this in mind, UW Political Science Associate Professor John Wilkerson built LegSim, an online congressional simulation tool. His goal was to enable students to better understand the legislative process by actively participating in it. Students spend the quarter serving as representatives of a virtual U.S. Congress, drafting and voting on bills, filing committee reports and crafting compromises with other virtual legislators.

Professor Wilkerson knew that students were engaged in the simulation, but he did not know how to measure if it was an effective learning tool; that is, does LegSim facilitate learning? Wilkerson asked PETTT to design a survey with this question in mind.

Through instructor consultations, classroom observations, and survey responses, PETTT researchers determined that LegSim did indeed facilitate learning. Its impact is evidenced by the percentage of students (88%) that find the tool preferable to classroom lectures.

Researchers also learned that there was a tenuous connection between the lecture, readings, and the
PETTT is enhancing innovative teaching and learning with technology.

In response, PETTT helped Wilkerson design a set of assignments that would ask students to make connections between course readings and their experiences in the simulation. Students would then be able to make explicit connections between theory and practice, giving their learning increased relevance and deeper meaning.

New assignments require new ways of assessing student learning. PETTT therefore helped design a rubric for grading the LegSim assignments. Additionally, PETTT researchers encouraged the instructor to build assessment components into the software redesign. As a result, Professor Wilkerson found that the redesigned simulation provided such an improved measure of student learning that, for this particular course, its ability to assess student learning was more effective than administering exams.

LegSim is an example of how technology in the classroom can reach its highest potential when coupled with the kind of thoughtful design and instructional support PETTT provides. LegSim and Wilkerson have been acknowledged by the American Political Science Association with the 2002 Information Technology and Politics Award.

**How does PETTT help learners learn through innovative uses of technology?** As part of its mission, the University of Washington seeks to cultivate in its students both critical thinking and the effective articulation of that thinking, as well as fostering an environment in which students can develop and mature independent judgment and an appreciation of the range and diversity of human achievement. **Portfolio,** developed by Catalyst with pedagogical support from PETTT, is a unique means by which to do that.

While it is intended as a reflective learning tool, Portfolio will be used in other capacities as well. Student guidance can be self-directed, as in the case of the FIG program, or more closely facilitated by faculty in the context of a class. Instructors may use “mentored portfolios” to further advance the learning process by tailoring MyPortfolio’s reflective prompts to address specific classroom issues. Additionally, the UW Career Counseling Center, Academic Advising and others have inquired about tailoring the tool for their use.
The Pipeline Project, a group that links K-12 with UW undergraduates in educational and service opportunities, will use Portfolio to document service learning. Coordinated by the Office of Educational Partnerships, Pipeline students partner with ArtsCorps to work with teaching artists at the Seattle Repertory Theater and in community centers. Students in this Pipeline program assist the teaching artist with the class and make a record of the learning that takes place.

Both Seattle Repertory Theater and ArtsCorps are interested in finding ways to make these “case studies” more widely available. In winter quarter of 2003, Pipeline students will be using Portfolio to document their projects, and their published portfolios will be linked to the Seattle Rep and ArtsCorps Web sites. PETTT researchers have been co-teaching Pipeline seminars, helping students to find ways to document learning and shape their stories. This strategy allows students to document and reflect on their UW service learning experiences in novel ways that benefit both the students and the UW’s service learning community.

In the case of LawforWa.org (Council on Public Legal Education) and the College of Architecture and Urban Planning’s Design/Build Database, technology’s role in enhancing student learning is evidenced in the new academic roles students assume. Students use the Knowledge Management System to create web content for their courses and for learners at large. In these communities of practice, students are active participants, exposed to the products and processes of experts.

Created in collaboration with the Washington State Bar Association, the Lawforwa.org project, allows UW Law and Information School students to find and categorize content for a public “legal gateway.” As part of their work, students were asked to assume the perspective of a potential visitor to the gateway and generate the questions that correspond to a particular segment of content. Through these activities, the students were active in determining the structure of a database and in creating its content.

In the Architecture project, the students contribute to a database by using article templates to write about the sustainable building practices they have researched. They will also gather information about
PETTT is building communities among people interested in education and technology.

The UW is so large and its body of research so vast that faculty members do not always have the opportunity to discuss and exchange ideas. This is certainly true for those who are interested in teaching with technology. PETTT knows that innovation succeeds when it takes place in a community.
that welcomes diversity of opinion and open discussion of new ideas. For this reason, PETTT’s work steps beyond research to nurture a culture of innovation in educational technology.

PETTT helps build community at many levels, bringing together individuals, specialized small groups, and large public forums. This work fosters relationships between faculty that have common interests in educational technology and brings notable educational events to campus. For instance, in October, 2002, PETTT helped coordinate the fifth conference of the International Conference of Learning Sciences. The theme—Keeping Learning Complex: Fostering Multidisciplinary Research Efforts—speaks precisely to the role of PETTT on the UW campus.

PETTT brings together the innovators and the interested for a variety of reasons: PETTT gives faculty more opportunities to share their work with colleagues and keep abreast of new ideas; PETTT brings field experts to the UW to offer the community new ways in which to think; PETTT identifies and coordinates collaborative efforts to eliminate duplication of services; and, PETTT builds collaborations that are self-sustaining and bring additional resources to the UW.

PETTT understands that everyone has discipline-specific needs, but the technological needs are shared. As David C. Blair writes in Journal of the American Society for Information Science and Technology, “knowledgeable individuals must be encouraged to pass their expertise to others through personal contact.” (Vol. 53, Issue 12, 2002).

How does PETTT bring together the UW community? PETTT is helping to build community through several programs that enable faculty and staff to exchange ideas about educational technology—across the campus and throughout academia. WebEd, for example, holds monthly PETTT-administered informal events that encourage pedagogical reflection and improvement by providing informal peer review and networking opportunities in three interrelated focus areas: pedagogy, technology and research. Regular meetings provide faculty with structured events in which to use the insights of their colleagues to evaluate current applications of educational technologies.
On a larger scale, PETTT also hosts **Spring Symposium**, an annual event that invites local and global experts to address educational technology issues. In 2001, Ricki Goldman-Segall, Professor of Computer and Information Sciences at New Jersey Institute of Technology, gave the keynote presentation “Locating the Learner: Educational Uses of Technology and Rich Media,” and in 2000, Roy Pea, Professor of Education at Stanford University, presented the keynote entitled “Towards Integrating the Sciences and Technologies of Learning for Education.” Each year these large public presentations are preceded by small topical sessions in which UW faculty present related projects and receive feedback from their colleagues and the symposium’s keynote speaker.

**How does PETTT collaborate with other UW departments and organizations?** One example of PETTT’s ability to build partnerships between several different groups can be found in the **Catalyst Assessment Resources**, a suite of tools that educators can use to evaluate their effectiveness in the classroom. Prior to PETTT’s involvement, several initiatives on campus had various means to help teachers teach—but the efforts were largely uncoordinated. PETTT brought together these groups to build a coordinated, collaborative effort, sharing expertise between PETTT, Catalyst, CIDR, and the Office of Educational Assessment. The result is a suite of well-researched online tools, and a network of support in many different offices, without duplication of services.

The development of **MyUWClass** was a similar collaboration—CIDR, the Educational Technology Development Group, Computing & Communications, and PETTT teamed together to imagine, research and develop a tool that will effectively integrate original Web-based teaching resources to be low-cost, easy-to-use, and widely applicable across disciplines.

PETTT’s collaborations bring new information and resources to the entire UW. **OnTechNews** is an online monthly newsletter for faculty, students and staff that unites several UW units to provide information on new technologies that can support teaching, learning and work. As a collaboration between the Center for Research and Development in Distance Learning, Computing and Communications, Educational Outreach, the Office of Educational Partnerships and Learning Technologies, UW Libraries and PETTT, OnTechNews reaches more than 70,000 members of the UW community.
PETTT's collaborations with educators are productive, ongoing, and contain provisions to increase the prospects of new, future collaborations. Created by Engineering Professor Cindy Atman, the Center for the Advancement of Engineering Education (CAEE) seeks to expand the engineering education research infrastructure, in part by developing the Engineering Education Portal that makes resources and tools available on the Web. The program will expand conceptions of engineering education, provide access to teaching resources and create mechanisms for instructional reflection and improvement—areas of expertise in which PETTT has been able to offer research assistance and technical expertise. Whereas PETTT's primary mission as a service-based UIF program is to enable and support such innovative thinking, the subsequent outcomes cannot be ignored—CAEE recently received an award of approximately $10 million over five years.

Similarly, PETTT's collaboration with Technical Communications Assistant Professor Jennifer Turns has enabled her work on the Center for Engineering Learning and Teaching Database to be recognized by the National Science Foundation (NSF). The database, built as a direct extension of the Knowledge Management System, will continue to be studied and implemented as part of PETTT's research, with the support of a $375,000 NSF grant over the next two years.

PETTT is helping the University of Washington share its knowledge work with the world

In the past, educational technology uses in higher education were left relatively unstudied. Instructors who wanted to integrate technology into their courses relied on trial-and-error, hoping that their guesses would have a positive return in student learning. What makes PETTT exciting is that its research gives teachers and learners answers on how to use educational technology best. PETTT disseminates what it learns in traditional and non-traditional publications, and PETTT makes research-informed design recommendations for educational tools and strategies. As a great public university, the University of Washington is charged with enabling its faculty, students and staff to achieve an excellence that well serves the state, region and nation. Similarly, PETTT has an obligation to think of...
the whole campus—the whole world—as part of its community.

One of the most effective means of disseminating PETTT’s work is the Catalyst Web site, a clearinghouse of tools and information for UW faculty. By collaborating with Catalyst, PETTT helps ensure that what it finds in its research is heard. PETTT publications on Catalyst include teaching guides on effective uses of educational technology, profiles of instructors and learning environments that PETTT studies, and revisions to existing documents to help UW faculty be proficient and efficient as they integrate technology into their curricula.

PETTT also relies on scholarly publications to disseminate its research across academia. More than twenty papers have been published in noted journals such as Educause Quarterly, Technical Communication, Human-Computer Interaction, Journal of American Medical Informatics, Behavior and Information Technology, and Journal of Undergraduate Research.

Here on campus, PETTT’s partnership with OnTechNews ensures that more than 70,000 members of the UW community receive monthly e-mail updates on the latest in educational technology. WebEd markets its meetings through campus mailings and e-mail updates; it also archives videos of monthly meetings on its Web site for further review and broader reach.

PETTT publishes on its own Web site to ensure that its work reaches those who can benefit from it. The site details its latest projects and presentations, as well as links to other initiatives with which PETTT has partnered. Similarly, PETTT’s spring symposia are also archived and easily retrievable on the Web.

PETTT’s work ensures that the many successes of the UW are not marginalized because they remain held within its institutional walls. The research, outreach and support provided by PETTT is spreading far beyond campus—throughout the state, nation and points around the globe—and will continue to help the UW gain international recognition by groups like the World Affairs Council.

“...I appreciate your help in engaging students and families in your community to envision the future of education in Washington. I applaud your commitment to ensuring that more equitable learning opportunities are available statewide.”

-Gary Locke, Governor of Washington
“In the future of learning, people capture and share their knowledge in more natural ways.”

–Reed Stevens, Faculty, Cognitive Studies
**Video Traces**, already a successful tool in dance composition classes at the UW, has been installed as a teaching tool at the Seattle Art Museum and the Pacific Science Center. Nationally, UW’s School of Architecture and Urban Planning, through the use of Video Traces, has recorded and annotated the construction of sustainable homes on the Northern Cheyenne Reservation in Eastern Montana. The School is bringing together professionals from the UW and Pennsylvania State University in a multitude of disciplines —architecture, public policy, cultural studies, construction engineering—using Video Traces the **Design/Build Database** they create will collect and streamline searches for current, detailed information in sustainable development.

“This project will create students that will have the skills to be leaders in the field,” predicts Penn State Associate Professor David Riley. “It will bring together people in the field of green architecture and enable them to build on each other’s work. This research is essential.”

The database will have global impact, as well, as sustainable building leaders enter data collected during field work. As UW Associate Professor Sergio Palleroni leads student groups to build libraries in Auroville, India, or Morelos, Mexico, they will be able to post the latest in sustainable building techniques on the Web immediately. The site will not only create a structure by which Palleroni and other instructors can create educational opportunities for students, but also will create a resource for other builders throughout the world. Already the fruits of these efforts are being seen. In December, 2002, Mexico’s First Lady Marta Sahagun de Fox acknowledged the Design/Build Mexico Program for their work in building the new Children’s Library in Joya Del Agua, Cuernavaca.
Lastly, the impact of the University of Washington can be seen simply by browsing the Arthritis Source's user map, which tracks its online visitors from around the world. On any given day, an average of 3,800 visits are made to the site. Not only does this help promote the UW, it honors a core mission of the university: to serve as a beacon of education throughout the world.

**Future Directions**

PETTT has been effective in working with faculty, students, programs, and beyond to meet the needs of teachers and learners. Technological needs will change and PETTT plans to be there along the way, making ongoing assessments and implementations of the University of Washington’s educational technology opportunities. This future work will take place through an iterative, continuous process of improvement informed by PETTT research.

**We listen.** PETTT combines quantitative and qualitative research methods to get at the true story of how the UW community is using technology in the service of education. Not only does PETTT use traditional methods such as surveys and focus groups to gather data, but PETTT also captures the story as it happens by meeting students and teachers in the places where learning happens: classrooms, field sites, even offices and hallways. PETTT’s strength is its ability to systematically listen to the community in every moment, from online feedback to discussion forums.

**We respond.** PETTT takes what it hears to inform the design and development of tools and strategies for the UW. The challenge for PETTT has been to identify technologies with exceptional potential, study them in real settings, and refine both the tools and the teaching strategies in which they are embedded. PETTT has succeeded in making those improvements within each of its projects. The power of PETTT is its ability to distill general principles for applying innovative tools broadly, across disciplines.
The focus of PETTT’s continued efforts will center on two of these tools: Video Traces and the Knowledge Management System. Video Traces has proven to be a valuable tool for education and educational assessment. PETTT brought the tool, along with pedagogical and technical assistance, to vastly different educational environments with great success. The resulting instructional improvements in engineering, medicine, dance, and sports are raising the quality of UW education and would not have happened without PETTT.

PETTT has shown that the Knowledge Management System meets needs for organizing and accessing knowledge not only in health care, but also in the practices of law, architecture, and the study of English. By focusing on principles rather than platforms, PETTT has been able to uncover the ideals of knowledge management and is building these components into technologies that can be used by the entire UW community.

PETTT will continue to meet UW teachers and learners where they are, and provide them with the research-informed tools and strategies they need to remain at the forefront of educational innovation. The future directions of PETTT are found here: ongoing assessment, and the continued research behind and novel application of Video Traces and the Knowledge Management System.

Through its multidisciplinary work, PETTT promotes innovation and collaboration among individuals in the service of learning. PETTT also works at an institutional level to leverage channels of information, expertise and resources of a variety of units throughout the University. We build on assets such as the enterprise-wide campus computing infrastructure (Computing & Communications), and develop mechanisms and processes to create institutional repositories of knowledge (UW Libraries). We conduct research to inform the development of Catalyst (Educational Partnerships and Learning Technologies), and leverage clinical applications of technology with the academic mission of UW Health Sciences (Medical Center Information Systems). We integrate systematic assessment and evaluation throughout the learning process (Office of Educational Assessment), and collaborate with the community to support multidisciplinary, transformative, technology-based strategies in the knowledge work of the University of Washington and beyond.

We look forward to opportunities to continue our work.
The Program for Educational Transformation Through Technology (PETTT) is a multidisciplinary UIF-funded initiative at the University of Washington that explores the interplay of technology and pedagogy in real settings. Our goal is to facilitate thoughtful and innovative educational technology uses through our research, development, and collaborative service activities. PETTT makes strong connections between research, design, and practice in order to bring the sciences of learning to teaching with technology.