



## University of Washington

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 apply the sciences of learning to teaching with technology.

<http://depts.washington.edu/pettt/>

PETTT has been made possible by funding from a University Initiatives Fund (UIF) Award encouraging and supporting interdisciplinary collaborative educational programs that strengthen the greater University of Washington community.

<http://www.washington.edu/uif/>



President  
University of Washington

Dear Dick:

It is with great pleasure that I submit to you the second year report on behalf of the Program for Educational Transformation Through Technology (PETTT). In this covering letter I want to provide a succinct statement of why this Program is essential to our University and what is happening as a direct result of the UIF investment in PETTT.

Universities are about the creation, organization, management, application and dissemination of knowledge. In a very real respect, universities are collections of knowledge workers. However, the changes that have occurred in universities have not grappled with the extraordinary implications of an age of knowledge, a culture of learning, which is our future. Effective universities need to establish communities of practice that will catalyze the effectiveness of their knowledge workers. Without these communities, universities become collections of brilliant people, but not examples of collective brilliance; while they may contain intelligence, they may not be intelligent as a whole.<sup>1</sup> The opportunity we now face is for our University to create a thriving community that fosters the continuous creation, aggregation, use and re-use of knowledge in the pursuit of new value.

PETTT is a collaboration among some of the University of Washington's knowledge workers who are dedicated to connecting and catalyzing educational brilliance in a way that contributes to the collective brilliance of the University. We are particularly interested in effective and innovative strategies for working with knowledge, particularly those that use technology to make the educational efforts of our students and faculty enduring, enhanceable, accessible, scalable and disseminatable within and beyond our campus. We make strong connections between research, design, and practice in order to apply the sciences of learning to teaching with technology. Specifically, our goals are:

- to spark innovation, inspiration and rigorous evaluation of new technology-based strategies in the knowledge work of the University
- to facilitate communication and collaboration among those committed to the progressive optimization of education
- to help create an environment of educational entrepreneurship at the University of Washington.

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<sup>1</sup> Into the 21<sup>st</sup> Century: Academic Health Centers as Knowledge Leaders. The Blue Ridge Academic Health Group, University of Virginia Health System, Charlottesville, 2000.

In this, our second annual report, we point to initiatives, collaborations, and achievements, which, without explicit involvement from PETTT, would not have happened at the UW. We will focus particularly on our work to

- Reach out to bring together previously unassociated groups of teachers, learners and researchers
- Listen to the learners — allowing the ultimate consumers of our educational efforts to drive the content and form of knowledge exchange
- Use the sciences of learning to evaluate the effectiveness of technology-based educational strategies in real world settings.
- Disseminate our efforts broadly across the UW community and beyond.

Thanks to you and the entire UW community for your support of and engagement with the Program for Educational Transformation Through Technology. It is a program that is transforming each member of our team and, we believe, the University of Washington as whole. Below, you will find some comments made by faculty, staff, and students regarding PETTT.

Sincerely,



Frederick A. Matsen, Principal Investigator  
Program for Educational Transformation through Technology

- "The initiation of the PETTT program (Program for Educational Transformation through Technology) 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 A&S Report on Enhancing Student Learning (Page 21)  
<http://www.artsci.washington.edu/asreports/List.htm>
- 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 its 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 Program for the Educational Transformation through Technology (PETTT).
  - Pat Wasely, Dean College of Education

- "The Arthritis Foundation, North Puget Sound Branch in Bellingham is very proud to have had the opportunity of working with the PETTT team. It was a very rewarding learning experience for all the Helpline volunteers and staff. The Arthritis Source is now a valuable tool used daily. For many volunteers the Arthritis Source was an introduction to Web browsing. It is now our standard place to search for answers to difficult arthritis-related questions. We appreciate the reliability and authority of the Source. We find it extremely helpful to be able to ask questions by email.
  - Barbara Osen, Branch Director Arthritis Foundation, Washington/Alaska Chapter
  
- For several years, the Department of Computer Science & Engineering (CSE) has taught CSE490CA, an interdisciplinary capstone design course in which students from CSE, art, music, architecture, and other fields design and digitally produce a computer animated short in a quarter. PETTT saw an opportunity to use the course as the basis for a partnership in a nascent digital animation center with CSE, the UW Libraries, and UW Educational Partnerships. Through a generous sharing of space and information specialists, the Odegaard Undergraduate Library, under the direction of Jill McKinstry, made it possible for CSE490A to further improve this part of CSE's state-of-the-art digital animation curriculum. PETTT's vision was essential in putting the UW Libraries together with CSE, with the animation course only the first of several shared initiatives that are underway.
  - David Notkin, Chair CSE
  
- While interning with PETTT, I was able to work with people from a number of different departments across campus that I would have otherwise not had the opportunity to get to know. I worked with faculty from various disciplines, researchers, fellow students and software developers. In this way, it gave me valuable real world experience concerning interfacing with people from many different occupations and backgrounds.
  - Josef Larson, Student Intern



## Progress Report Year 2: 2000-2001

Imagine a first rate public research university where

- . multidisciplinary groups of researchers, teachers and learners collaborate to enable the pursuit of knowledge by students with diverse backgrounds and interests

- .technology-based strategies create new opportunities for learning about arthritis and music for individuals of all social classes and ethnic groups in classrooms and across our rural demography

- .technology enables the faculty to perpetuate their educational creativity and energy in way that dramatically leverages the most precious resources of money and faculty time

- .the dissemination of innovative technologies stimulates exciting new strategies in education that stretched the minds of faculty

- .educational strategies are continuously and rigorously evaluated in real world settings

- .technology enables the faculty to listen and respond to the needs of learners across our multicultural and multinational society

technology extends our teaching and learning far beyond the university institutional walls, setting the stage for the university to have a positive impact on individuals worldwide

The Program for Educational Transformation Through Technology is helping the University of Washington become this imagined university. Since its inception two years ago, the growing number of faculty, students and staff associated with PETTT have been dedicated to the mission of helping teachers to teach, helping learners to learn and helping disseminate the knowledge work of our university across our campus and worldwide. PETTT's goals are to apply the sciences of learning to the evaluation of educational strategies in the real world and to develop technology-based educational approaches that can be used in widely differing disciplines and that can be scaled from serving individual learners to serving the global population.

In this document, we describe PETTT's activities during our second year of UIF funding. We use examples of these activities to demonstrate how PETTT contributes to the UW along the four themes of 1) bringing together multidisciplinary groups of teachers, learners, and researchers; 2) listening to the learners; 3) evaluating uses of educational technology in real world settings and 4) disseminating our findings to the UW community and beyond.

## PETTT Year 2 Activities

During our second year, we have actively sought collaborations across the breadth and depth of the University of Washington. Some of the highlights of our second year activities are listed below. Detailed information about each of these activities can be found in the appendices of this document.

- Arthritis Source: The Arthritis Source is a web-based information resource created to help self-motivated, geographically dispersed learners ( learners at large ) gain access to information about arthritis. The system was developed to support the needs of everyone who interacts with it - the learners, the site managers, and the content creators. PETTT has worked with the Arthritis Source for the past two years, using a science of learning framework to analyze and evaluate the site. As a result, we have developed a content creation system that will meet the needs of both learners and teachers.
- Video Traces: Video Traces is a system that makes it easy to capture a piece of rich digital media, such as video, and to annotate that media verbally and by gesturing. These video traces can then be viewed by the creator, exchanged, and further annotated by others for a variety of teaching and learning purposes. We have introduced Video Traces in a number of educational settings, including an undergraduate choreography class, an architecture design/build studio course, and the Pacific Science Center.
- Tutored Video Instruction: The Tutored Video Instruction (TVI) model utilizes a set of recorded lectures as the main medium for content delivery. A tutor/instructor for a TVI course acts as a facilitator, encouraging students to pause the tape to ask questions about the material. PETTT has worked with the Department of Computer Science and Engineering to adapt the TVI approach so that community colleges can effectively use it to offer introductory programming courses to their students. We have created a set of Classroom Assessment Tools (CATs) which allow instructors to collect information about what students are learning, and which provide a context for students to raise questions about the content of the lectures.
- Facet-Based Assessment: Facet-based assessment is an innovative way for teachers to continually monitor their students' understandings of concepts that are discussed in class. Teachers can then use this knowledge to guide their teaching. PETTT has explored this approach to assessment by investigating how facets can be identified and used in introductory computer science courses.
- Web Ed: The goal of WebEd is to 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. These meetings are also a chance to present and discuss original PETTT research with members of our service community.
- Spring Symposium: For the past two years, PETTT has sponsored a spring forum intended to bring together faculty, staff, and students from across the university. Together, we consider how current and emerging technologies and practices are extending or changing conventional

concepts of education and learning. The forum format includes a set of presentations that are open to all, and a smaller working session of UW personnel. The spring forums have been video taped, and are available via UWTV and the Research Channel.

- **Faculty Survey:** Technology has fundamentally changed the ways in which we manage information and communicate with one another. While technology has provided us with more choices about how to accomplish these tasks, it has also increased the demands made on our time, energy, and resources. In order to gauge the effect that technology has had at UW, PETTT has co-sponsored a survey of all UW faculty. The goal of the survey is to better understand the ways in which UW faculty use and desire to use technology to support instruction, and to identify the resources needed to improve these uses.
- **eGroup:** The eGroup is an ensemble of individuals from the UW community who are working to create templates for web-based, learner/patient-driven, multimedia digital libraries in order to promote patient-centered health management collaborations. PETTT is working with the eGroup to design and develop a diabetes self-management system that will serve as a test bed for patient-physician partnership systems for a variety of medical conditions.

## **How Does PETTT Contribute to UW?**

PETTT complements and enhances the efforts of other programs at the university by integrating research, development, and service activities to transform the process of teaching with technology. We identify and develop potential collaborative efforts, bringing together multidisciplinary groups of teachers, learners, and researchers. We work closely with UW faculty and students to create a university-wide dialogue about teaching and learning with technology. In order to make our work accessible, we focus on creating generalizable, scalable, and enhanceable resources for the UW community. Our activities span a diverse set of learning environments, learners, and pedagogical approaches: from large lecture halls to field learning experiences; from undergraduates at UW to learners at large around the world; from lecture-based instruction to problem-based learning.

### **PETTT reaches out to bring together multidisciplinary groups of teachers, learners, and researchers.**

One attribute of the UIF program is that it encourages faculty to transcend their unit specificity, fostering academic risk taking. PETTT has contributed to this endeavor by reaching out to the UW community, bringing together diverse groups of educators, learners, and researchers to engage in discussions about educational technology.

Some of the highlights of our work with multidisciplinary group are described below:

- PETTT brought together faculty members from the School of Medicine, College of Education, and School of Music to discuss how annotations of rich media could be used to teach music composition. We are continuing to discuss how the Video Traces software might be adapted for music education.

- PETTT researchers met with undergraduate Freshman Interest Group (FIG) leaders and software developers from the Educational Technology Group to discuss the design and development of an electronic portfolio tool. Together, we are exploring how electronic portfolios might enhance student learning and create opportunities for reflection on learning. We will use the results of PETTT studies to guide the design of a Catalyst Portfolio Tool. This tool will allow students to collect and display a variety of objects that illustrate their accomplishments.
- PETTT convened a meeting of the eGroup, a multidisciplinary group with members from several departments in the School of Medicine (e.g., Medical Education, Biomedical and Health Informatics, Orthopedics and Sports Medicine, Family Medicine), the Department of Bioengineering, and Computing and Communications. The eGroup is working to leverage clinical enterprise information systems in support of educational efforts. By building on PETTT's work with the Arthritis Source, and integrating the work of other group members, we are developing a system by which patients and other learners with concerns about a condition might easily find answers to their questions in order to promote patient-centered health management collaborations.

### **PETTT listens to the learners.**

PETTT strives to create resources that are adaptive and responsive to the needs of both teachers and learners. We listen to the learner using a variety of mechanisms, such as classroom observations, surveys, and interviews. As we listen, we formulate recommendations for redesigning the learning environment to make more effective use of technology, as well as recommendations for redesigning the technology itself. Listening is an on-going process - part of a dynamic cycle that links research, design, and use of educational technology.

- Arthritis Source: Understanding the needs of learners is particularly challenging when the learners are geographically and temporally dispersed. In our work with the Arthritis Source, a web-based information resource, we have collected information about both the kind of information that learners want to obtain and the form in which this information is most useful. We gathered this information using a variety of mechanisms, ranging from surveys and phone interviews with site users, to analysis of web page log files, to analysis of discussions that occur on arthritis bulletin boards. One result of this work is the development of a question-driven navigation system, which will allow users to continue to drive the development of the site through their interactions with it.
- TVI: In our first year, we worked with the Department of Computer Science and Engineering and several community colleges to implement a teaching method called Tutored Video Instruction (TVI). TVI utilizes a set of recorded lectures as the main medium for content delivery. A tutor acts as the facilitator, encouraging students to pause the recordings to ask questions about the material. In our initial experiences with these materials, we found that students rarely initiated discussion, and that the discussions that did occur were short. As a result, in our second year, we have created a set of Classroom Assessment Tools (CATs) to stimulate discussion about topics presented in the videos. These materials provide scaffolding for the tutor, who may not be an expert in the content, by providing structured

class activities and help with difficult concepts. These materials also help tutors listen to their students by providing an on-going way to gauge the progress of the class as a whole, and to identify trouble spots.

### **PETTT evaluates uses of educational technology in real world settings.**

PETTT applies a science of learning approach to research on teaching with technology, studying the ways teachers teach and learners learn in real world settings. We take an interdisciplinary approach to research, using a variety of methodologies, such as field observations, content analysis, interviews, and surveys.

- Video Traces: PETTT has worked with the Department of Dance to evaluate the use of the Video Traces software in an undergraduate dance composition class. In this exploratory study, we worked with six students in the class to explore ways in how they could use Video Traces in their process of creating dances for class assignments. Students used Video Traces in a number of ways to represent ideas related to their work, including planning for rehearsals, documenting aesthetic intentions for the dance, and making connections between formal concepts and practice. As a result of our exploratory study, Video Traces will be used by the instructors and all students in a 2001-2002 three-quarter sequence in dance composition. PETTT researchers will evaluate the use of Video Traces as a collaborative tool and as a new method for assessing student work.
- Arthritis Source: The Arthritis Source makes high quality information available to learners-at-large via the web. Because simply providing information does not ensure that learning occurs, PETTT has been developing methods for evaluating the effectiveness of the Arthritis Source. During our second year, we collected and analyzed data from a variety of sources to better understand our learners, the strengths and limitations of the Arthritis Source, and how our learners interacted with the Source. These data sources include an online survey, phone interviews, web-collected user satisfaction ratings, and user feedback. Our analysis of this data spurred the redesign of the site, including the development of a question-based interface.

### **PETTT disseminates its findings to the UW community and beyond.**

PETTT strives to serve the UW community by disseminating its work in ways that are useful to faculty. We disseminate our results in a variety of ways, from web-based resources created in conjunction with Catalyst, to presentations to classes and groups of faculty at UW, to conference presentations and journal articles.

- Promising Practices: PETTT has created a feature called Promising Practices that will be added to each Catalyst Teaching page. Promising Practices will include stories by educators about their real experiences using the technologies and pedagogical strategies highlighted on those pages. Promising Practices differ from Catalyst Profiles in that they will contain literature citations, current research findings, and stories of local experiences. We began evaluating how to best present Promising Practices in October 2001.

- WebEd Picks: PETTT is working with the Educational Technology Development Group to select great examples of UW educational web sites to be featured on Catalyst's web site. These sites will be selected every one to two weeks, and will be thematically aligned with WebEd's monthly topic.
- OnTechNews: PETTT is working with several other UW units to form the OnTechNews Advisory Group. OnTechNews is a monthly online newsletter that informs UW faculty, staff, and students about interesting new technologies that can be used to support teaching, learning, and work. The newsletter goes out via email each month to nearly 70,000 members of the UW community.

## **Revisiting Our Vision**

PETTT's vision is a university where faculty and students thoughtfully use technology to support teaching and learning. Our approach to instantiating this vision has evolved through listening to the learners at the University of Washington. The resulting work has been described in brief here, and is detailed in the appendices that follow. In the upcoming year, we will continue to work towards this vision by creating new collaborations with UW faculty, building on and generalizing the results of our early work, and seeking additional resources to support our work.

## **What's Ahead for PETTT?**

Through our information-gathering and outreach efforts at UW and our knowledge about current directions in educational technology research, we have identified a number of focal research areas: technology-mediated communication, educational video artifacts, Web-based educational systems, and case-based teaching and learning. These strategic areas represent key issues in the research community, as well as areas that are of interest to a broad cross-section of the UW community of educators.

PETTT will continue to stimulate conversations and collaborations around these focal areas, while adding new areas that build on our existing work, respond to new projects and interests of UW educators, and reflect new directions in research in educational technology. We have identified several areas of exploration for the coming year, including service and field learning, redesign of large-enrollment courses, student self-assessment, information literacy, and departmental libraries of teaching materials. PETTT's work in these areas will ensure that the university can meet the challenges of educational excellence in the years to come.