

Using Data to Design ^{and Re-design} Courses

The 3rd Annual UW Teaching and Learning Symposium
April 24, 2007 • 2:30 p.m.
HUB West Ballroom

The CIDR Spring Quarterly Forum on Teaching and Learning is being held in conjunction with the 3rd Annual UW Teaching and Learning Symposium:

CIDR Quarterly Forum on Teaching and Learning

CIDR's Spring Quarterly Forum on Teaching and Learning will feature Scott Freeman, UW Department of Biology, speaking on "Using Data to Design (and Re-design) Courses."

3rd Annual UW Teaching and Learning Symposium

The Quarterly Forum will be followed by the Annual UW Teaching and Learning Symposium. This year's Symposium will feature 34 concurrent poster sessions on teaching innovations by 70 UW faculty and TAs, representing 32 different departments and programs on all three UW campuses.

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Keynote Address



*Scott Freeman
UW Department of Biology*

"Using Data to Design (and Re-design) Courses"

What is the best course design to use in a large, introductory course in order to maximize learning and performance by all students?

Scott Freeman will present how he and a group of colleagues have used data from the research literature and from their own teaching to redesign Biology 180, a large gateway course for Biology majors, with the goal of increasing student learning and lowering the traditionally high failure rate in the course.

In his presentation, Scott will review

- several contrasting course designs that have been tried in Biology 180,
- why each course design was expected to improve student learning and success in the course, and
- how the current design of the course has been informed by research and by data collected through previous offerings of the course

This study is part of a broader effort to evaluate the role of active learning in improving the quality of science education.

Concurrent Poster Sessions



Posters Sessions are grouped into five areas:

Experiential Learning

*Engaging students in learning through experience
Posters 1-7*

Learning Through Assessment

*Using assessment data to improve teaching and learning
Posters 8-13*

Extending Learning

*Using strategies or technologies that extend learning in
different ways, or to different learners
Posters 14-20*

Course Re/Design

*Developing new courses or re-envisioning established courses
Posters 21-28*

Examining Teaching

*Exploring how we think and make decisions about teaching
Posters 29-34*

For Poster Titles, see Index on page 43

Mentoring Undergraduate Researchers: Where to Begin?

Janice DeCosmo and Jennifer Harris - Undergraduate Research Program, Center for Experiential Learning

Now more than ever, undergraduates are taking on significant roles in research settings at the UW and, in addition to faculty, postdoctoral researchers and graduate students are often assuming primary responsibility for guiding these developing researchers. In addition to supporting undergraduate student involvement in faculty research, the Undergraduate Research Program is committed to assisting faculty, postdoctoral researchers, and graduate students who wish to augment their mentoring repertoire for undergraduate researchers. Our work highlights best practices for mentoring undergraduate researchers, including communication of goals and expectations of mentees and mentors, elements of effective mentoring, and where to go for resources. We invite visitors to discuss ideas and challenges they have experienced in mentoring undergraduate researchers.

A graphic illustration of this growing trend is that over 600 students will present their work at this year's Tenth Annual UW Undergraduate Research Symposium, a 13% increase over last year and a continuation of a decade-long pattern of growth.

Adaptation to Altitude as a Vehicle for Experiential Learning of Cardiopulmonary Physiology by University Undergraduates

D. Scott Weigle and student participants from our High Altitude Physiology Exploration Seminar - UW School of Medicine, College of Arts and Sciences

This was an Exploration Seminar held from August 21 to September 15 both in Seattle and at the White Mountain Research Station in Bishop, California. The goal was to help students better understand cardiopulmonary physiology by monitoring their own acclimatization to altitudes between 12,500 and 14,200 feet on White Mountain. To accomplish this goal, students measured a number of physiological variables on each other at sea level and developed hypotheses as to how these measurements would change at altitude. They then repeated the measurements over the course of 10 days at White Mountain to assess their hypotheses. Thus, each student was both an experimental subject and investigator during the seminar.

The setting for the course was the UW Clinical Research Center and Pulmonary Function Laboratory in Seattle and the Barcroft Laboratory on White Mountain. The latter is an historical field station at which the physiological response to hypoxia (low blood oxygen level) has been examined over the course of many years. The students were UW undergraduates from any major who expressed an interest in the course material.

The outcome of this experience was measured by student papers written in the format of a scientific manuscript with properly presented data and full statistical analysis. Each student helped to develop and edit the paper of his/her research group. In addition, a formal manuscript describing the seminar is currently under review by *Advances in Physiology Education*, and the students will present a poster describing their work at the biennial International Hypoxia Symposium in Lake Louise, Canada in February of 2007.

We all learned that undergraduates from diverse educational backgrounds are capable of high-level scientific thinking and fieldwork requiring innovation, cooperation, and persistence. In addition we all had a lot of fun!

Immersion Experience in Entrepreneurship, ENTRE 472/473, "Creating a Company"

John Castle - Management & Organization, Business School

The objective of this course is to allow students to learn the fundamentals of starting a business by immersing themselves in the process. As a result they learn whether they want Entrepreneurship to be part of their career path. They learn to understand the importance of human factors in business success, including how well they personally manage relationships and handle stress. As they practice the business fundamentals learned in other courses, they observe how those disciplines interact with each other in the world outside of the classroom.

This course is learning by doing it, not by studying how others did it.

Virtual Reality with Simulation as a Teaching Strategy to Enable Senior Nursing Students to Develop Critical Thinking Skills

Gaylene Altman, Brian Ross, and Alice Acker - Biobehavioral Nursing and Health Care Systems

Education of nursing students is a challenge as society demands high quality care and yet mandates cost-effective reforms. Medical advances have also lead to more complex patient care requirements. Patient safety and favorable outcomes are at the forefront of nursing education. With recent reports of increased morbidity and mortality due to medical and nursing mistakes increased pressure has occurred to consider alternative methods of teaching. Traditional didactic methods tend to rely on passive learning and memorization with limited acquisition of skills and adequate transition into practice. Clinical practicum in hospitals cannot be controlled or paced according to sound educational techniques. Even if faculty attempt to select patients that match the curriculum, there are too many limitations and confounding variables to allow students to progress according to standard plan. In addition, because of recent reductions in time for clinical experience it has become difficult to ensure that students receive necessary experience and that graduates are prepared to provide competent and safe care. To alleviate this problem it has been necessary to develop new methods of teaching. One recent technological innovation has been the development of Human Patient Simulators (HPS) which can be directed to respond with physiological changes such variation of vital signs, respiratory and heart sound and create verbal responses. These HPS can be programmed to provide structured, educationally sound, interactive scenarios where students can be closely monitored and practice in a risk-free environment until they have achieved safe outcomes. In recent exercises senior nursing students from the University of Washington engaged in scenarios that closely resembled real life hospital situation using HPS. Students were presented with several acute care situations and were directed to care for patients as if these were actual events. The HPS was programmed to respond to appropriate or inappropriate care as delivered by the students. After practicing students were debriefed and the adequacy of care was evaluated. Practice continued until students could achieve criterion based safe care. Through collaboration and partnership with the Institute for Surgery and Interventional Simulation (ISIS) curriculum was developed to allowed team practice with medical and nursing students along with residents. This curriculum was developed to enhance communication between disciplines in acute care events and ensure best outcome for patients.

Community-Oriented Public Health Practice: A Problem-based Learning Graduate Degree Program

Bud Nicola and Caren Goldenberg - Health Services, School of Public Health and Community Medicine

The Master in Public Health in Community-Oriented Public Health Practice (COPHP) is an innovative program that prepares students for careers as public health practitioners. It combines rigorous academic preparation with a commitment to social justice and community involvement. The COPHP program is uniquely structured to build practical skills that its graduates will apply in community settings - as problem-solvers, innovators, advocates, and leaders in addressing health problems.

COPHP graduates will complete their degree work with a solid foundation in the core disciplines of public health: epidemiology, biostatistics, environmental health, social and behavioral science, and health services management. Just as important, they will acquire invaluable public health competencies.

The COPHP program is built on a unique philosophy and approach, as well as a challenging, case-based learning method, problem-based learning (PBL). The program uses PBL because it continually reinforces the practical skills that public health practitioners will need throughout their careers, such as working in teams, recognizing and deconstructing problems, and collecting, analyzing, and presenting information clearly and persuasively.

Inquiry-based Learning and Online Environments: "Moodling about..."

David Masuda - Medical Education and Biomedical Informatics

Our graduate program in biomedical informatics involves students at masters, doctoral, postdoctoral and executive, and a common challenge for these advanced level students revolves around metacognition. Commonly they have come through years of traditional education in which self-assessment of learning is secondary, if not absent. In short, they have rarely considered the questions of "How do I know what I know?" and "How do I best learn?" in an active, and prescriptive way. Over the past 2 years I have delivered a range of courses in a hybrid in-person/online environment within which students move through a series of active learning modules, roughly based on the Anchored Modular Inquiry model of Bransford and Vye. Using the open-source learning management system Moodle, I've worked to design a series of interchangeable modules that encourage student engagement through the use of multimedia instructional resources and open fora for discussion, conversation and debate - both designed to enable students to reflect on their own learning styles and, with luck, to aid them in better developing their life-long learning skills.

IR-Toolbox: An Experiential Learning Tool for Teaching Information Retrieval

Efthimis N. Efthimiadis - The Information School

The explosion of the web has made search an integral part of our daily lives. We search for almost any conceivable topic. Web search engines have made search easily approachable to almost everyone. Yet, for information professionals it is more important than ever before to know "how search works" in order to be more effective in their work. Search Engines or Information Retrieval systems often appear to searchers as "black boxes." There is some sort of magic that happens between typing some keywords in a query box and getting back results. This approach contributes to the development of inadequate conceptual models of search.

The IR-Toolbox is an experiential teaching tool for learning about information retrieval (IR) systems. Through hands on interaction, the IR-Toolbox helps students develop their conceptual model of search engines by exploring, visualizing, and understanding IR processes and algorithms without needing to program. In a sequential fashion, the IR-Toolbox presents the following processing steps:

- a) Document analysis (e.g., tokenizers [letter, white-space, grammar], stemmers [Porter, Krovetz], and a variety of stop lists),
- b) Indexing (e.g., ability to browse the inverted file and extract statistics),
- c) Searching (e.g., ability to enter queries and select weighing algorithms such as IDF, tf-IDF, OKAPI/BM25),
- d) Evaluation (e.g., evaluate results using the TREC evaluation software (trec-eval) and associated TREC collections, presenting recall-precision tables and graphs).

Students can interact with the IR-Toolbox at different levels of complexity on individual or group exercises that help them understand the different IR processes and build a more detailed conceptual model of search engines.

To evaluate the effectiveness of the IR-Toolbox students complete online questionnaires using Catalyst WebQ. Results show that students really like the IR-Toolbox, because they are able to see what happens behind the scenes, and understand how algorithms work. The poster will present examples of how the IR-Toolbox is used, and results from the student surveys.

The Use of Sketches as a Tool for Identifying Gaps in Students' Conceptual Models of "How Search Engines Work"

Efthimis N. Efthimiadis and David G. Hendry - The Information School

Search engines have entered popular culture. They touch people in diverse private and public settings and thus raise important questions about their use. To fully benefit from search engines and to participate in debate about their merits, people necessarily appeal to their understandings of how they function. Thus, people with more accurate and complete models for these search engines are more empowered. To examine the nature of this technical knowledge, over 230 undergraduate and graduate students in Information School classes were prompted to draw sketches of how a search engine works.

This tool has been used in different ways in the classroom in order to improve the student conceptual models through participation and active learning opportunities:

- In each class, after the sketches were completed the instructors ask the students to contribute to the creation of a sketch on the whiteboard. This collectively drawn sketch integrates the conceptual models of the students into a new one that is more complete.
- A reference model was constructed and each sketch was analyzed and compared against it for completeness. Analysis of the sketches reveals a diverse range of conceptual approaches, metaphors, representations, and misconceptions. On the whole, students with higher levels of academic achievement sketched more complete models. This research calls attention to the importance of improving students' technical knowledge for how search engines work so they can be better equipped to develop and advocate policies for how search engines should be embedded in, and restricted from, various private and public information settings.
- For each class the sketches provide a way of educational assessment and knowledge gap identification so that the class curriculum can be re-designed to meet students' needs.
- The information extracted from the sketches is also used in classes in order to discuss information system design issues.

Documentation Creates Space to Reflect upon Teaching, Learning and Assessment

Tom Drummond (Early Childhood Education), Kalyn Shea Owens (Chemistry), and Jim Harnish (Faculty Emeritus) - North Seattle Community College

We are trying to understand what is happening in the actual process or activities of “learning”. We examine the meaning of complex events, how we think about what we want to emerge for learners, and what we, as participants in education, share as values.

Our students are Community College students, which range from 16-17 year old Running Start students, to traditional age college students, to 30-50+ year old returning students, some with BA degrees, in the first year General Chemistry sequence.

We video tape and then “capture” a group of students engaged in representing an understanding in Chemistry and explore what we see, the students see, Chemistry program faculty see, other faculty see, and institutional assessment leaders see. We make the reciprocity of meaning-making visible. Like the students working on a chemistry concept, we construct pedagogical practices and judgments in relation with others, based on values that are chosen, shared and constructed together. Documentation enables us to live in a permanent state of research that evolves practices over time.

Some of the things we have learned include:

- Documentation of a learning group allows its participants to engage in meta-cognitive dialogues with others to better understand risk, interdependence, and not-knowing; they become transformed, highly-motivated learners.
- Documentation provides a unique opportunity for faculty to reflect upon the common effort; it deepens the discussion of what is learning, what is effective pedagogy and what could check on concepts that are developed over a series of courses.
- Documentation enables faculty in other disciplines to reflect upon what is learning, how people learn and how educators think about classroom practices and intentions.
- Institutional assessment leaders come to see how documentation of a learning episode enables faculty in the classroom, faculty groups at a program level, and institutional leaders could evolve shared values and intentions toward an aesthetic of educational experience.

Point recapture: Learning from Exams

Linda Martin-Morris - Biology

Too often instructors use exams for assessment only. They can serve a far more instructive role as well. Students will learn to hate and fear exams less if they are an avenue toward learning rather than merely a tool for weeding out good test takers from bad. Championed by many outstanding educators whose emphasis is on student learning (examples - Susan Gron at University of Delaware, Robin Wright at University of Minnesota), opportunities for point recapture AFTER an exam enable students to do more than bring up their grade. Designed purposefully, point recapture opportunities facilitate better comprehension of course concepts AND better habits of mind for students' future exam preparation and exam-taking experiences.

Using Small Group Test Retakes to Foster Collaboration and Enhance Learning

Constance Hirnle and Karen Thomas - Biobehavioral Nursing and Health Systems, Parent and Child Nursing

NURS 401, Care of Illness, is a large lecture class that is a requirement for all undergraduate nursing majors. We evaluate student progress with objective, multiple choice tests that are similar to the NCLEX licensing exam that our graduates must pass to become registered nurses. During the class period following each of the unit exams, the students break into small pre-assigned mini groups to retake the same test. The group is given 15 minutes to collaborate together to re-answer the 40 multiple choice test questions. Individuals can earn up to 3% points depending on the score they received on the group re-take. Between the test and the group retake much study and discussion between students occurs to debate the best answer to challenging questions that were on the exam. Positives of the mini group tests re-take include: learning from classmates, understanding the content rather than just focusing on the grade, reducing absences from exams since you need to take the scheduled exam to qualify for the retake, decreasing test anxiety since you can improve your grade slightly on the retake. As a teacher I have seen arguing over unfair questions almost eliminated using this method, since classmates provide insight into rationale for the correct answer. The students love it, as demonstrated by anonymous feedback we received on Jan. 24, 2007 stating "Your double test style is the best testing format I have ever experienced! It should be standard practice for all teachers."

Using e-Portfolios in a Program Core Course

David S. Goldstein - Interdisciplinary Arts and Sciences, UW Bothell

In BIS 300, the required course for incoming juniors in UW Bothell's Interdisciplinary Arts and Sciences Program, students are learning new academic skills. Rather than assess each piece of work submitted after students' first attempts at new skills, I use portfolios to emphasize practice and revision.

After submitting a portfolio at the midquarter point, students receive suggestions from me regarding revision, and resubmit their portfolios again at the end of the quarter for formal assessment. Students report feeling more free to try new ways of approaching their writing and more confidence in their finished work.

Among the advantages of electronic portfolios over traditional, "hard copy" portfolios are remote access (students and I have access to the e-Portfolio from any computer with an Internet connection, which is important for an all-commuter campus like ours) and electronic archives (students can retrieve their materials--along with my comments--whenever they need them, such as when they take their senior capstone course).

The Journey to Best Practices: Early Steps in Implementing e-Portfolios

Cara Lane, Janice Fournier, Laura Baldwin, Steven Corbett, and Kelly Reinhard - Catalyst Research & Development, English

What does it take to journey beyond basic access to technology towards a meaningful implementation?

The poster documents the gradual and incremental changes in instructional practice, technical support, and departmental culture that accompanied the Expository Writing Program's (EWP) introduction of Catalyst Portfolio. Several characteristics of EWP made it an ideal setting for adoption of e-Portfolio: (1) the program had in place clearly articulated course outcomes and a well-developed paper portfolio assignment; (2) administrators and instructors easily saw a fit between the Portfolio tool and the established curriculum. Other aspects of the program and classroom practice, however, posed challenges for the e-Portfolio pilot: (1) all sections of beginning composition are taught by teaching assistants, many of which have no prior teaching experience; (2) EWP is part of the English department, which, traditionally, does not have a strong technology culture.

We gathered data about e-Portfolio implementation from the following sources: instructor and administrator interviews, instructor and student questionnaires, and a review of instructor assignments and student e-Portfolios.

While, in general terms, the e-Portfolio was successful, our research identified four critical variables within the instructional context that affected, positively and/or negatively, the implementation of e-Portfolios. These include: assignment function, instructional practice, access to technology, and audience engagement. For example, students' writing in e-portfolios tended to address an audience beyond the instructor, unlike the cover letter of the paper portfolio. However, opportunities for exchange of e-Portfolios among peers were limited and there was no structured opportunity to engage an outside audience. Both instructors and administrators felt that additional steps will need to be taken in the future to more directly engage an authentic audience beyond the classroom. This example is illustrative of the everyday dilemmas and progressive transformation that are part of technology adoption on any scale.

Zines! Student Expression through Creative Scholarship

*Kari Lerum, Amanda Hornby, and Suzan Parker - Interdisciplinary Arts & Sciences;
UW Bothell Library*

Students in Kari Lerum's BIS 445: Meanings and Realities of Inequality course (UWB, Fall quarter 2006) were asked to create a zine* about an aspect of social inequality. Using a variety of creative methods – interviews, illustrations, research & photography – students then used their zine as a stepping stone for their final research project.

The purpose of this assignment was to give students a creative and personal outlet for exploring a topic related to social inequality. The hope of the instructor was that through the zine making process, students would be able to develop a more complex and emotionally textured understanding of a “social problem,” and that this would improve the quality and depth of the students' questions and approach to their final assignment.

While we do not have systematic outcomes analysis of the zine assignment, several pieces of evidence exists that points to the conclusion that the assignment was successful in many areas. For one, the final papers in this class, on average, were better products than in previous classes with the same final project but a different mid-term project (as reflected in grades on final projects). Comments from students in the final course evaluations were also highly enthusiastic.

* “Zines” are short for magazine or fanzine, zines are self-publications, motivated by a desire for self-expression, not for profit. Zines can be copied or printed; small or big; written, typed, typeset or drawn; and on any subject the creator cares about. Zines have been around as long as printing presses have been. For most of the 20th century, zines have usually been “fanzines” (a zine about one subject that the creator is a big fan of). But over the last ten years, more and more zines have appeared that are more like mini-magazines with a personal perspective or point of view.

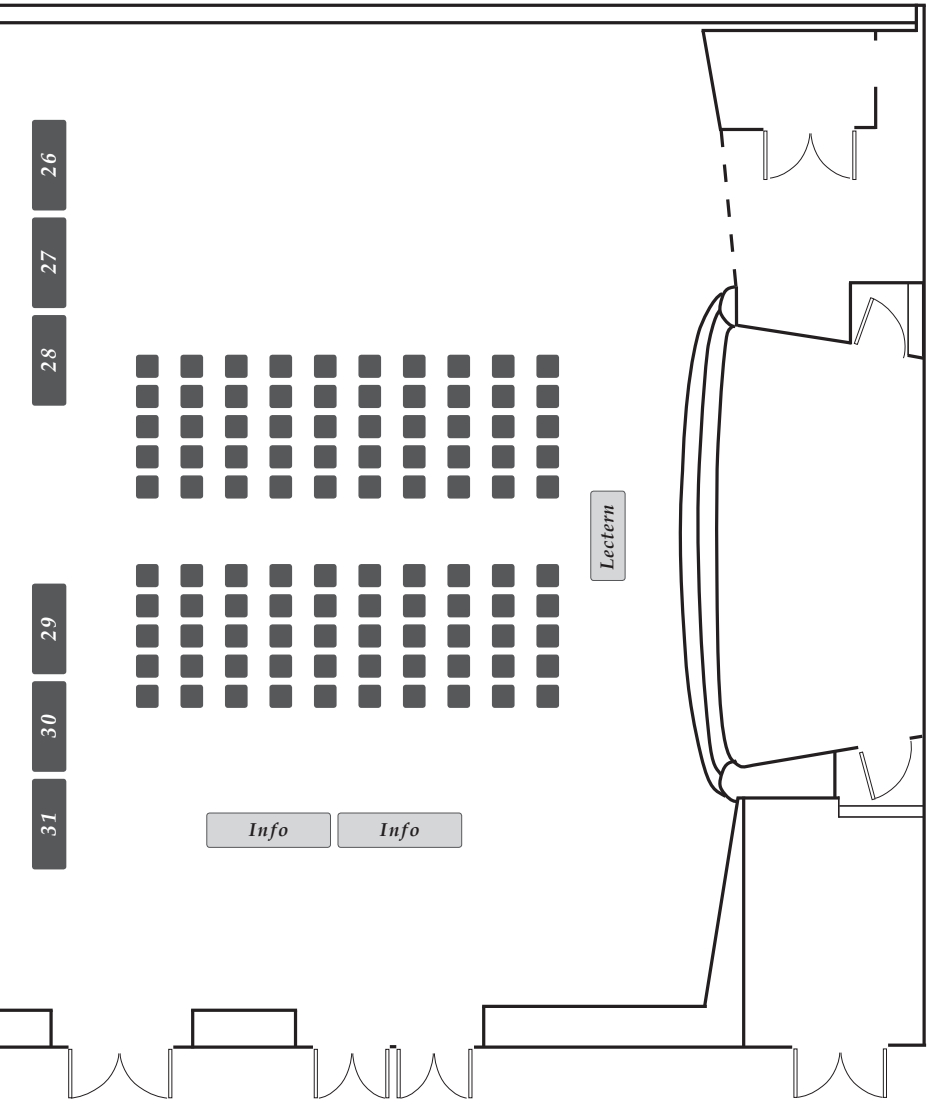
"The World in Motion:" Using Animation to Interest Students in the Arts and Humanities

Phillip Thurtle and Stephanie Andrews - Comparative History of Ideas and DxArts

This class studies animation to explore what it means to live in a world of constant change and transformation. It is a project based class designed to incorporate cutting edge technological expression with critical theoretical reflection. Students will learn by viewing a diverse selection of animated work, reading about how media informs our perceptions of time and space, and working on creative projects. They will finish the quarter with a piece of creative digital animation that develops the themes of the class in innovative directions. More specifically, students will ask: What does it mean to be animated? What techniques are used to create the illusionary gestures of animation? How do animation practices differ in different parts of the world? How has time-based media developed in the West? How can technology expand our perceptions about animation? As the course instructors, we are especially interested in the course's ability to use practical engagement with technology to increase students' engagement in highly theoretical questions.

Ballroom

For Poster Titles, see Index on Page 43



Streaming Video – Extending Learning Beyond the Classroom

Bruce Lippke, Luke Rogers & Matthew McLaughlin - College of Forest Resources

Interactive streaming video is an established technology used to enhance the utility of the World Wide Web for distance learning applications by extending the video viewing process. It allows the user to view synchronized video, PowerPoint slides and HTML pages within a web browser. Interactive, synchronized streaming video presentations have tremendous potential as an educational outreach tool for distance learning deliveries. It also can be used to dramatically increase the accessibility of information presented at seminars, conferences, and workshops by making content available to a worldwide audience. Presentations can be watched with either a dial-up modem or a high-speed connection, and they can also be distributed on CD-ROM or DVD. Until recently, software, equipment, and expertise needed to create streaming videos made this technology accessible to only a few. New developments have reduced camera costs and made available freeware products that make streaming video an affordable communication technology for most educational applications. The Rural Technology Initiative (RTI) is pioneering the use of this technology in forestry education and has helped hasten adoption by rural educators through development of a “how to” tutorial on streaming video. Since 2002, RTI staff has produced over 350 streaming video presentations on forestry related topics and have kept detailed viewing statistics on each presentation. These statistics allow RTI staff to determine courses of interest and focus efforts in relevant distance learning materials. By monitoring the use of streaming video presentations, talking with constituents, training others to use the technology, and partnering with dozens of educational collaborators, RTI has demonstrated the value of streaming video technology in education and information delivery.

Incorporating On-line Activities and Group Work to Enhance Student Learning and In-Class Participation

Peter Mackenzie and Greg Miller - Civil and Environmental Engineering

The College of Engineering offers a series of courses at the sophomore level. These courses are offered during most quarters, and they are almost always attended by a very large class. Students take these courses as prerequisite for various engineering departments, a fact which makes them very competitive.

The traditional way of lecture, lab, and written homework was the common way how these courses are taught until recently. Under this model, it was very common to observe a bi-modal distribution of grades for midterms and the final exam. Finding the source of this separation into a stronger and a weaker group of students was the initial question in addressing the issue. Surveying members of the weak group revealed problems with self assessment ahead of the (first) exam, a lack of practice work, and insufficient feedback.

The proposed solution was adding a series of on-line activities to enhance participation in and effectiveness of the lectures. These consist of reading assignments with linked pre-lecture on-line quizzing with automated feedback, on-line submission of homework results, instant automated grading and feedback, and the option to improve and resubmit homework solutions.

These modifications were first established in Winter 2005 and observed by the Office of Educational Assessment. The focus was both on objective effectiveness and subjective in-class experience of students, TAs, and instructor. A series of surveys throughout the quarter and statistical analyses of subsequent courses showed improved performance of the weaker group, resulting in a uni-modal distribution of grades. An overall improvement of grades was of no statistical significance. The subjective experience, however, improved for all involved groups.

Reaching the Benefits of Collaborative Learning: Wikis are Tricky

Bryan White - Program in Neurobiology and Behavior / Pharmacology

Although the benefits of collaborative learning are known by educators, students often are apprehensive toward working in groups, especially if they have been successful with lecture-format methods. I designed a course where in-class group activities and a collaborative group project would be central to the class. In Winter 2007 I taught a neural stem cell class to 10 upper-class neurobiology students implementing this collaborative curriculum (NBIO440--Neural stem cell response to CNS pathology: from basic science techniques to medical promise). Students worked in small groups on in-class activities to interpret data, design experiments, and critique grants. In addition, they participated in a quarter-long collaborative research project examining the feasibility of stem cell therapy for a particular CNS pathology of their choice. They presented their research in an in-class poster session and created an on-line wiki site of their findings. Student thoughts on collaborative group learning were assessed by questionnaire at the beginning and end of the course. Although students could articulate the benefits of group work in the abstract, it seemed challenging for them to implement those benefits in reality. Revisiting the benefits of group work during the quarter and being explicit about certain aspects of group interaction throughout the class may better support collaborative learning.

Tapping the Creativity and Insight of Undergraduate and First-Year Graduate Students in the Development of Tutorials and Interactive Exercises in Introductory Astronomy

Ana M. Larson (plus 15 co-authors) - Astronomy

Recent studies from the education research group at the University of Arizona have shown significant improvement in student learning in astronomy through the use of lecture tutorials and interactive learning. Unfortunately, the topics and concepts they address cover only a small portion of what is taught in the introductory, non-science-major, Astronomy 101 courses at Washington. Efforts by U of W astronomy faculty to expand these tutorials and relate them to the “real-world” of astronomers through quantitative exercises have been frustratingly limited due to the simple lack of faculty time. A direct plea for undergraduates interested in pursuing this educational aspect of astronomy along with their regular coursework brought positive responses: 2 undergraduates working on an individual basis and 13 undergraduate and 2 graduate students working as a team have created a series of 3 new lecture tutorials and corresponding interactive-learning exercises. One undergraduate, S. Schmoll, is currently pursuing preliminary results that show a significant increase in the test scores between students in Autumn Quarter 2005 and Autumn Quarter 2006 due to her work covering the parallaxes of stars. The guidance in the development of these tutorials and interactive-learning exercises has brought out the following “discoveries” about undergraduates and first-year graduate students: they are 1) more attuned to undergraduate “speak”; 2) able to analyze the thinking patterns needed to understand a difficult or abstract concept; 3) sophisticated enough to learn how students learn; and 4) not afraid to criticize poorly constructed tutorials and exercises. The process of involving these students in the development of learning tools may lead to a more student-centered approach to teaching introductory astronomy, one that involves only a brief introduction to a topic or concept followed by a tutorial and exercise that have the students work through their quantitative analyses and critical thinking questions.

Bringing Astronomy to Sight-Impaired Students at the University of Washington

Virginia Player and Ana Larson - Astronomy

A few years ago, an on-campus meeting for the visually impaired brought a student visitor to the Jacobsen Observatory. Although legally blind, the student was able to look through the telescope's eyepiece and, for the first time in her life, view a bright star. Words cannot describe her emotions that night, nor those of the visitors within the observatory who witnessed this wonderful event. That experience led to discussions about how to bring astronomy to blind students.

We are currently pursuing efforts to formalize a four- or five-part mini-series on the Sun, planets, and stars. We have built a scaled model solar system (where stepping at one-foot a second is equivalent to traveling at the speed of light), created a "hands-on" planet surface activity, and purchased the available "Touch" books by Noreen Grice, the leader in authoring descriptive picture books on astronomy. We then invited two local, blind, high school students who had previously expressed interest in pursuing courses in physics, math, and astronomy to "test" our first teaching unit. Not only were the students able to get a sense of the scale of our solar system, but they were also able to finally "see" the rings of Saturn as they really are. They compared the sizes of the Sun, Earth, and Moon. They felt the distance between the Moon and Earth. After making a "comet" and working with the "stretching of space-time around a black hole," the two students gave us two thumbs up.

Our future efforts include making small relief globes of the terrestrial planets and formally designing the curriculum. Through this Scholarship of Teaching and Learning Symposium, we hope to network with others, share our ideas and discuss similar programs that are already in place across the nation.

The Effectiveness of the Interdisciplinary Writing Program in Boosting Student Grades in the Linked Courses

Nancy Kool, Ana Larson - English, Astronomy

The goal of the Interdisciplinary Writing Program (IWP) at the University of Washington is to help students learn about writing in a particular discipline; students in the program attend the related courses during the same quarter. A writing link with Astronomy 101 was begun Spring Quarter, 2002. Almost immediately the instructors involved noticed a secondary effect: As a group, those students enrolled in the IWP link did better overall in the Astronomy 101 course. We present the results for 8 quarters total (2002 - 2006), and show that the trend has continued. We also address the statistics that show the backgrounds of the students in the IWP link do not differ significantly from the general astronomy population. While these kinds of results may be expected, this is the first study to quantify what previously has been only anecdotal evidence.

Integrating Writing into a Cell Biology Laboratory Class

Alison J Crowe - Biology

The Department of Biology is participating in the 4 x 4 writing initiative funded by the College of Arts & Sciences with the goal of better integrating writing into our curriculum. I have focused on developing a writing-integrated cell biology laboratory that provides a capstone research experience for senior biology majors.

The premise of the class is to teach and excite students about the scientific process by engaging them in an on-going research project. One of the learning goals for the class is to communicate their findings and future research plans in the form of a written grant proposal. The class is taught sequentially in fall, winter and spring; however, a new group of 24 students will participate in the on-going research project each quarter. The grant proposals will thus provide continuity of ideas from one quarter to the next. Winter quarter students will form review panels and critically evaluate the fall quarter proposals. Projects selected for "funding" by the review panels will then be further developed and form the basis of new grant proposals to be submitted to spring quarter.

To facilitate peer evaluation of the grant proposals and to better prepare students to write their own proposals we introduced a rubric in winter quarter that identifies the key criteria on which each proposal is to be evaluated. Winter quarter proposals will be evaluated using this same rubric. By introducing the rubric early in winter quarter and incorporating a two-step process, critical evaluation of written proposals followed by formulation of new grant proposals, our goal is to teach students how to self-identify and correct flaws in their own writing. The effect of this process on student writing performance will be measured by comparing students' grant proposal scores in fall and winter quarter.

Teaching to Care: Using Caring Theory and Narrative Pedagogy to Enhance Patient and Family Education

Jerelyn Resnick and Theresa Chason - UW Bothell Nursing Program

Ads promoting nursing careers highlight the profession's caring nature. But, how do students learn to care and incorporate it into nursing practice, in which teaching of patients, families, communities and other nurses is a critical component? Although aspects of caring can be learned through clinical role modeling, how do nursing students learn and experience it in classrooms and web-based assignments? What are the theoretical and pedagogical links between a practice-based theory of caring and learning to educate someone about health and illness? How does narrative pedagogy provide a framework and context for teaching and learning about teaching and learning?

We—a lecturer and graduate student—are exploring these developmental questions in the course Teaching and Learning Strategies for Patient and Family Education. Our students are nurses in the UWB BSN completion program. Their nursing experience ranges from new graduates to 30 years.

They are learning and applying a variety of assessment and teaching strategies, learning theories and models. To more deeply explore how these apply to nursing practice, we decided to introduce Swanson's theory of nurse caring and the use of patient narrative to understand the patient's perspective. On Blackboard, students wrote narratives as though they were patients, some so realistic their classmates were in tears and worried about each other's health. They ably applied the nurse caring theory to these narratives. We were surprised by the power of this assignment and wanted to explore further links between theory and practice. Now, we have asked them to write community-based narratives, and to propose education strategies adapted to the patient's needs and context. We are beginning to assess how narratives help students use aspects of the teaching/learning theories and models and the nurse caring theory to develop and deliver more patient-centered education. What we are learning has already changed our teaching.

Using General Models can Enhance Student Understanding in Physiology

Kate Henson and Mary Pat Wenderoth - Biology

Students often compartmentalize their knowledge and therefore fail to recognize the principles that are common between topics. General models in physiology provide a way of making the common physiological patterns explicit to students. General models are teaching models that represent accepted scientific models in physiology. We predict that by introducing the students to the concepts of general models at the beginning of the course, they could use the general models to form robust mental models that can be used to explain, predict and apply to physiological problems. We introduced four of the seven general models: Flux, Mass Balance, Mass Action and Control Systems. On all exams, students were told to specifically identify the general model when relevant to solving an exam question. We analyzed student exams for their use of GM and the quality (points scored) of their answers. We found that students who correctly identified and used the GM earned significantly more points on the question. We also analyzed student's qualitative answers to questions about the usefulness of general models. We found that students who correctly used GM in exam answers also had the most sophisticated understanding of the usefulness of General Models for their explanatory and predictive powers and their transferable nature. We believe that using GM as a teaching tool enhances student understanding in physiology and we are currently exploring additional strategies to help students use them more effectively.

Teaching Evolution as an Applied Science?

Jevin West - Biology

Despite the nearly unanimous acceptance within the scientific community, evolution is one of the most widely misunderstood concepts among the general public. The social controversy associated with the teaching of this subject suggests that there may be a failure in an aspect of basic science education. To address this issue, we propose to develop a course geared towards high school biology teachers. The course will have two objectives: (1) provide for high school teachers the resources to deal with this issue and (2) create a platform for developing successful pedagogies that high school biology teachers can use. We will ask and address questions like the following: are teleological and anthropomorphic explanations appropriate for topics like evolution; is constructivism and engagement of a student's preconceptions an effective way to teach; how valuable is the lab experience in evolutionary biology; and is teaching evolutionary biology as an applied science a worthwhile endeavor? The work is presently in progress. Comments and suggestions on the experimental design are welcome.

Germany in the Age of Globalization

Gabi Eichmanns - Germanics

The course I intend to teach in fall 2007 will be a cross-disciplinary class entitled "Germany in the Age of Globalization" for undergraduates from various disciplines: Germanics, Comparative Literature, English, and Comparative History of Ideas. My class will serve as a pilot project, since there is currently no other class nationwide that focuses specifically on the implications of globalization in the field of German studies. Thus, one of the main purposes of the class will be to create a website together with my students so that the content of the class can serve as a model for other similar projects in the future. Furthermore, it seems to me of special interest to offer this class to an American audience; to involve American students in the critical study of global (American) tendencies in the reunified Germany, and to examine closely the negative as well as positive stereotypes linked to American influences. It is my goal to raise the awareness for things American in other countries among my students by focusing both on theoretical scholarly texts as well as film clips, newspaper articles, advertisement and pop music.

Students will be put into groups of five (class size is limited to thirty participants) and will be assigned a research project. The respective research topics will also be lectured on and discussed during class; however, the challenge for the students lies in taking their projects a step further and focusing on an aspect not previously addressed in class. To insure that students will keep up with the reading material and not solely focus on their projects, five one-page response papers are required over the course of the quarter.

In addition, I will use different techniques to monitor the students' assessment of the new teaching materials: brief questionnaires throughout the quarter, a student interview by CIDR, as well as a final survey at the end of the quarter. Moreover, the website will serve as a means to measure both the students' progress and their overall involvement in the project. In addition to these methods, a class journal I intend to maintain will also help me to evaluate my daily performance and to make possible changes and improvements over the course of the quarter.

This work is presently in progress. Comments and suggestions on the design and plans or assessment are welcome.

Teaching Science Students and Humanities Students in the Same Classroom

Vladimir Chaloupka - Physics, Adjunct Professor, School of Music and Jackson School of International Studies

The difficult problems our society faces can only be solved by a wide participation of informed and educated citizens. This is a report on a highly interdisciplinary course on "Science and Society" offered jointly by the Physics Department and the Jackson School as PHYS216/SIS216. The enrollment is not limited to the two sponsoring units - the goal is to achieve a truly trans-disciplinary mix of students with diverse backgrounds. The idea is that students will learn not just from the Instructor, but from each other as well, and that the course will represent a microcosm of the wide participation mentioned above.

The diversity in the enrollment pattern was achieved already in the first test offering of the course in Spring 2006, and the student response to the Spring 2007 offering is very encouraging, ranging from Freshmen to Seniors, and from Physics majors to English majors. The premise of the course is that an informed, educated citizen ought to know enough about science to be able to appreciate the enormous potential benefits as well as the possible dangers which science represents. The course explores the current status and developments in Physics, Nanotechnology, Biotechnology and Computer Science, and we discuss the implications for society at the local, national and international (global) level. Nuclear physics and molecular biology serve as concrete examples of fields with significant impact on society. There is both exuberance and humility in our treatment of the issues, and both feelings are often illustrated using the playground of Music.

The experience in teaching science to non-science students while motivating the science students to think about the social impact of science will be described, with emphasis on the difficult parts, such as dealing with the extreme diversity in the students' backgrounds, and dealing with sensitive issues such as the interplay of science with politics or religion.

Supporting Classroom Discussion with Technology: A Case Study in Environmental Science

Tom Hinckley, Natalie Linnell, Richard Anderson, Jim Fridley, Sarah Reichard, and Valentin Razmov - College of Forest Resources, Department of Computer Sciences and Engineering

We describe how technology is used in the classroom to support our pedagogical goals in teaching several Environmental Science courses. In 2003 we revised our junior level course sequence to utilize an interdisciplinary, problem-solving focus and to foster active- and experiential-based learning. This naturally led to changes in instructional format and pedagogy, with an increased emphasis on student participation, in-class activities, and stronger ties with the field component of the course. We initially implemented these changes through traditional means. However, the results from these were frequently not satisfying for either the student or instructor. Often exercises only engaged a portion of the class or exercises took too long and became cumbersome as a result of the medium chosen.

Starting in winter 2006, we were able to use networked Tablet PCs running Classroom Presenter™ to facilitate students' in-class interaction with the instructional materials and the class. Lectures were developed using traditional Powerpoint™ slides, converted to the Classroom Presenter™ software. Groups of two students were then periodically and formally engaged in designed exercises. Exercise preparation and integration into each lecture in itself facilitated improved instructional attention to pedagogy and greater clarity of material for the students. Instructor and student assessment suggested significant increases in student participation. In addition, instructors and students found the technology beneficial to teaching and learning, respectively.

Flexible Learning Spaces: The Integration of Pedagogy, Physical Design, and Instructional Technology

Rebecca Etheridge and Stern Neill - Teaching and Learning Center & the Milgard School of Business, UW Tacoma

The traditional classroom can be transformed through an appreciation of differing approaches to teaching and learning, application of effective physical design, and adoption of instructional technology. In leading this transformation, a team representing the Teaching and Learning Center, Information Technology, and faculty at the University of Washington Tacoma collaborated on the development, implementation, and assessment of a flexible learning space for classroom use.

The overall project goal was to enhance instructional effectiveness and student learning through the integration of pedagogy, physical design, and instructional technology. This goal was achieved through a classroom design that provides for quick reconfiguration to support different modes of teaching and learning. The room accommodates up to fifty-four students and is being used for a variety of courses (e.g., business, math, science, writing, and others) and by different student types (e.g., new/current and undergraduate/graduate). To assess the room, data were gathered through observation, interviews, and surveys. Data collection is ongoing.

Initial survey results indicate that the room's flexibility 1) increases student engagement, 2) facilitates collaborative learning, 3) allows for a variety of uses, and 4) enhances the teaching/learning style of participants. In addition to these findings we will present observations on how faculty and students experiment with different configurations and applications (e.g., lecture, demonstrations, in-class activities, and team-based project) along with faculty feedback on the room's efficacy and use.

Exploring Mountains Beyond Mountains: Teaching about Global Health Inequities

Alka Arora, Center for Curriculum Transformation

In 2006, the University of Washington piloted a Common Book program, using Tracy Kidder's *Mountains Beyond Mountains*, as a way to engage the campus community in productive dialogue about issues of global health, inequalities, and social service. To help highlight issues of diversity in the book, the Center for Curriculum Transformation convened a seminar of sixteen faculty members, graduate students, and undergraduates to develop a guide to studying and teaching the text. This interdisciplinary group developed pedagogical strategies for raising issues of identity, inequality and social justice as they related to *Mountains*. Seminar members developed papers on topics as wide ranging as medical anthropology, post-colonialism, and identity politics; each paper introduced the topic at hand, related it to the Common Book, and posed study questions. We posted these papers on the Center for Curriculum Transformation website, and developed a booklet that served as a road map to the project and website. These booklets were disseminated to students across campus.

Our poster session will explain how we came to identify the need for the study guide, how the teaching notes were developed, and the impact that our work had on the UW community.

Motivational Filters: How Students Decide which Material is Worth the Effort

Susan B. Nolen, Chris Ward, Ilana S. Horn, S. Sunshine Campbell, Karan Mahna - Educational Psychology and Curriculum & Instruction, College of Education

We are conducting a longitudinal case-based ethnographic study of student learning, motivation, and identity development in our teacher education program. Specifically, we are interested in why and how students take up certain promoted ideas and teaching practices and reject others, both in courses and in field practica. Students go from the university classroom ("TEPworld") to the schools ("Fieldworld") and back multiple times, and must negotiate both their developing teacher identities and practices in each context. We collected fieldnotes in all courses and practica, conducted multiple interviews with TEP students, instructors, cooperating teachers, and supervisors. Presented with multiple, sometimes conflicting promoted practices and ideas, we focused on the motivational filters students use to decide what is worth learning, and aspects of the learning contexts that support or hinder motivation. We have taken what we have learned back to our courses and to inform our program renewal efforts. This presentation will focus on how students use motivational filters to decide what to learn.

Decisions about Teaching: What Factors do Engineering Faculty Consider?

Jessica Yellin, Yi-Min Huang, Jennifer Turns, Brook Sattler - Center for Engineering Learning and Teaching

This poster presentation uses a cognitive science methodology for investigating the phenomenon of teaching decision making in engineering education. We conducted semi-structured interviews with 34 current engineering faculty using a critical incident approach. In these interviews, we asked faculty to identify two memorable, recent teaching-related decisions in terms of pre-active (planning) and interactive (in-class) stages. Faculty described the situation, their process for making the decision, the factors that they took into account, and their level of satisfaction with the outcome of their teaching-related decision. These interviews were audio-recorded and transcribed. This poster presents an exploratory study that we conducted using a subset of the data consisting of 10 interview transcripts.

In this poster presentation, we focus on time as the one specific and pervasive factor that faculty considered when making teaching decisions. The factor of time emerged across all 10 interviews in this subset of the data. Although participants generally acknowledged time as a constraint or limitation, some participants also revealed their beliefs that time issues can sometimes be beyond being a constraint. Their responses suggested creative solutions for overcoming time as a limitation. We categorized these approaches for considering and managing time in three ways: faculty-centered approaches, student-centered approaches, and content-centered approaches.

Semi-Exempt?: Institutional Review Boards, SoTL, and the Ethics of Review

Michael Goldberg - Interdisciplinary Arts and Sciences, UW Bothell

The role of Institutional Review Boards (IRBs) in SoTL projects varies greatly in different higher education institutions across the country. One fairly consistent aspect of this relationship is the level of anxiety it generates in researchers. Although U.S. Government guidelines expressly exempt many types of traditional SoTL data gathering techniques from IRB review, higher educational institutions often ignore the exemption or else require the researcher to receive approval of the exemption. This poster will present the range of approaches to IRB review of SoTL projects, provide a discussion of the federal guidelines, and explore the ethical issues involved in conducting SoTL research as well as IRB review and obstruction of exempt SoTL projects. It will also provide a discussion of UW IRB policies and practices, and will consider current problems noted by UW SoTL researchers and possible solutions.

Are Graduate Students Being Left Out of the SoTL Movement?

*Angela Davis, Danielle Beck, Jaime Diaz, Janice Driver, Erin Hunter, Gregory Reaume
– Psychology*

The Scholarship of Teaching and Learning (SoTL) has become increasingly prominent in our universities today. Whereas faculty initiatives for SoTL have been widespread, commensurate attention to graduate student involvement has been less common. It seems imperative that graduate students, the future professoriate, must also receive SoTL training as part of their broader pedagogical training. In order to examine perceptions about teaching training, graduate students (n=85) and faculty (n=23) in the Psychology department completed an online survey.

While there was not a significant difference between the ratings of faculty and graduate students for how important they think teaching is to the overall mission of a research university, graduate students did not perceive teaching to be as important to the mission of UW as the faculty did ($p < .01$). The majority of the faculty also said they if given the opportunity they would use their grants to forego their teaching responsibilities. Furthermore, although faculty perceived that they were quite supportive of their graduate students' teaching training, graduate students reported that faculty were not supportive (20%) or in fact were discouraging (20%) of their pursuing teaching training vis a vis research training. These data show the subtle yet sharp double message that graduate students seem to be receiving concerning teaching.

While SoTL issues may be embraced by certain faculty, SoTL does not seem to be important enough to be incorporated into graduate student professional training both in theory and in practice. Since the majority of the graduate students sampled desired a certificated teaching program and more direct mentorship from faculty, the present study suggests that a more comprehensive SoTL program is necessary to ensure that our graduate students will assume leadership roles in forging the new Academy.

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“The scholarship of teaching is not merely teaching our scholarship. Nor is it simply teaching well The scholarship of teaching means that we invest in our teaching the intellectual powers we practice in our research”

Indiana University Professors Eileen Bender and Donald Grey
<http://www.indiana.edu/%7Ercapub/v22n1/p03.html>, emphasis added

For more information about scholarship of teaching and learning at the University of Washington, see

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

To learn more about ways that CIDR can be a resource for faculty and TAs who are examining teaching and learning in their courses, see

<http://depts.washington.edu/cidrweb/consulting/sotl.html>



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