

VII. STANDING COMMITTEE

A. Academic and Student Affairs Committee

Innovations in Undergraduate Education

See Attachments.

**Innovations in Undergraduate Education
Interim Report**

**College of Arts & Sciences
University of Washington**

February 2006

For two years, the Arts & Sciences Learning Initiative has provided guidance and resources to help faculty and departments: 1) develop inquiry-driven, student-centered, and cost-effective learning approaches shaped by comprehensive assessments of student work; and 2) embrace a learning paradigm as foundational to the College's approach to undergraduate education. The goal of enhancing and transforming the undergraduate experience requires the College to fund initiatives that have broad impact – and the Learning Initiative has allowed us to make significant advances in the quality of the academic experience at UW. Thus far, the College has supported teaching and learning innovations that have directly affected 30 departments, representing three-quarters of all Arts and Sciences academic units, and more than 100 faculty, representing over 10 percent of the faculty in the College).

Essentially every one of the 23,000 undergraduate students in A&S and all other students who graduate from UW and take their foundational and general education courses in the College, by the time each graduates, will have enrolled in a course – in most cases many courses – and degree program(s) that have been supported by this initiative.

With the need for broad impact, the Learning Initiative has supported fundamental course re-designs in some of our largest undergraduate courses, as well as some of our largest departments. In addition and as the tables at the end of this report show, the Learning Initiative has also supported smaller but highly prestigious programs at the UW, such as the Jackson School for International Studies.

Projects Supported through the Learning Initiative

With funds totaling \$1 million from the Office of Provost (\$500,000 grants provided to A&S in both the 2004-2005 and 2005-2006 academic years), the College of Arts & Sciences began an ambitious program to transform the nature of the undergraduate learning experience across the College.

Projects Supported through the Learning Initiative

Since 2004 the College has supported faculty from 30 of the 40 Arts and Sciences departments. These projects have included:

- **Foundations Courses** in Accounting^{*}, Biology, Chemistry, Economics, the Jackson School of International Studies, Psychology, Physics, Anthropology, Cinema Studies, Earth and Space Sciences, English, Sociology, and Women Studies.
- **Web-Enhanced Foreign Language Instruction** in 100-level German, Japanese, and Spanish courses.
- **Learning in the Major** projects in the Dance Program and the departments of Geography, Women Studies, Psychology, Anthropology, and Sociology.
- **4 X 4 Writing** workshops for faculty members in ten departments, including American Ethnic Studies, American Indian Studies, Anthropology, Mathematics, Scandinavian Studies, Speech and Hearing Sciences, Dance, Psychology, Philosophy, and Cinema Studies.
- **Program in Curricular Development** in Applied Math, Art (Division of Photography), Atmospheric Sciences, and Communication.

Close-Up on one Project: Biology

A. Biology 180

Biology 180 initiates a three-quarter sequence of introductory courses for students intending to major in Biology or related fields. Students earn five credits based on four lecture periods and a three-hour lab each week. The course enrolls 345 students per quarter or approximately 1200 enrollments annually. About 80 percent of these students intend to go on to graduate or professional school – usually in health-related fields.

Because at least two quarters of inorganic chemistry are required as a prerequisite, most Biology 180 students are sophomores or juniors. Yet despite their undergraduate experience and large investment in natural sciences courses, many students fail the course. Students, for example, must receive a grade of 1.5 or better to enroll in Biology 200 and continue in the sequence; they must also average a 2.0 in Biology 180, 200, and 220 in order to declare Biology as a major.

In Spring 2002, 18 percent of Biology 180 students failed to receive a 1.5 and almost 31 percent received grades below 2.0. When the same faculty member added an array of daily active learning exercises to the course design in Spring 2003, the failure rate improved only slightly, (16 percent of students receiving grades below 1.5; and 28 percent of students receiving grades below 2.0).

Why were so many students failing? With support from the Dean of the College of Arts and Sciences, staff from the UW Office of Educational Assessment (OEA) analyzed data on 3,400 students who took the Biology 180, 200, 220 series over the past four years.

^{*} Although not part of the College of Arts & Sciences, the College provided assessment resources to the Business School and the Department of Accounting and included Accounting faculty in all Arts & Sciences workshops and meetings.

The results showed that the most important predictor of failing one or more courses in the series was UW GPA at the time of registering. In Biology 180, SAT verbal score was also an important predictor of failure. Follow-up work by Biology Department faculty has shown that students who are underrepresented minorities and/or in EOP are very likely to be in this high-risk category.

Based on these analyses, it seemed clear that students who were struggling in Biology 180 were also struggling in other courses, and that the written exams in Biology 180 were a challenge for many students with weak verbal skills. Now the question became: now that we know who they are, how can we help these students?

Changes

To increase student achievement and reduce the failure rate, Biology 180 faculty proposed to test several new types of active-learning strategies: 1) daily, in-class, multiple-choice questions that were either graded via a radio frequency student-response system (“clickers”), or un-graded via cards held aloft by students; and 2) weekly, peer-graded, written practice exams that were either done in groups of four or individually online.

With support from the College of Arts and Sciences through a Foundations Course grant, Biology 180 faculty and staff split the Spring 2005 course into two sections (sections taught back-to-back from identical overhead transparencies, by the same instructor who taught the course in Spring 2002 and Spring 2003). Faculty then evaluated student performance on identical midterm and final exam questions, based on their risk score and their participation in one of the four course designs implemented: clickers + study group, clickers + online, cards + study group, cards + online. Using a regression model that emerged from the OEA analysis of failing students, staff were also able to generate a risk score for each student taking the class in Spring 2005 and categorize them a priori as high risk (lowest 25 percent of class), medium risk (middle 50 percent), or low risk (highest 25 percent).

Consequences

The results provided convincing evidence that on average, students did better in the newly revised course than students had done in previous quarters. Consequences included:

- **A drop in the failure rate.** The failure rate dropped to 11 percent of students with grades below 1.5 and 21 percent of students with grades below 2.0
- **Improved exam scores.** There was a statistically significant improvement in average total exam points – from 257 points in Spring 2002 and 256 points in Spring 2003, to 270 in spring 2005; and on a midterm identical to one given in Spring 2003. Students in Spring 2005 achieved a median that was eight points higher.

- **Best strategies for high-risk students.** Although there was no significant difference in exam performance among the four course design groups when all students were considered, the story changed when only high-risk students were analyzed. Here the data showed strong evidence that high-risk students did best in the clickers + online group.
- **Follow-up study.** With support from the Dean's office, Biology 180 is currently being taught by the same instructor in two back-to-back sections, with all students doing weekly, peer-graded, written questions by themselves online. Students in both sections are answering identical in-class clicker questions, but in one section students are given points for participation, while in the other section students receive points based on right/wrong answers. The goal of this work is to determine whether learning gains documented in Spring 2005 were simply due to increased attendance or if learning gains were based on grading of work.
- **Presentations to Biology faculty.** Biology 180 faculty and staff have given two presentations on the work to colleagues in the department thus far, and discussions are currently underway to use the results to change the course designs in all Biology 180, 200, and 220 classes.

The Learning Initiative APPENDIX A ~ ARTS AND SCIENCES PROJECTS, 2004-06

FOUNDATIONS COURSES 2004-2006				
Department	Faculty	Project Summary	Assessment Plans	Outcomes to Date
Accounting 2004-2005	Bill Wells Elizabeth Widdison Gary Sundem Nola-Jean Bamberry	<ul style="list-style-type: none"> Integrate online activities into Accounting 215/225, prerequisites for the Business major Cut face-to-face time by half Substitute an optional lab for TA-led sections 	<ul style="list-style-type: none"> Identify learning goals for 215 and 225 Conduct mid-course surveys Track students' lab use Track retention Compare course evaluations Compare traditional and experimental class scores on shared exam questions 	<ul style="list-style-type: none"> Increase in attrition and no significant change in performance Identification of successful aspects of course Suggested revisions for next iteration include creating a library of online activities for students.
Anthropology 2005-2006	To be selected by RFP by the department's Committee on Teaching and Learning	Six faculty develop 100-level courses to serve as foundations into the major. Proposal includes one RA and a project coordinator	<ul style="list-style-type: none"> Identify learning goals that overlap for all six courses OR 100-level learning goals that the six courses include (as well as goals that are specific to each of them if desired) Conduct portfolio-based assessment, summer 2006, with portfolio gathering undertaken during courses. 	<ul style="list-style-type: none"> Six proposed courses were selected from submitted proposals Next step: development of learning goals for all six
Applied Math 2005-2006	Nathan Kuntz Two TAs Consultation with CSE	<ul style="list-style-type: none"> Design and build web-enhanced infrastructure for managing course homework Create homework 	<ul style="list-style-type: none"> Identify learning goals for AMATH 301 Compare student performance in traditional with that in new Compare student satisfaction in traditional with that in new 	In development
Biology 180/200/220 2004-2005	Scott Freeman Mary Pat Wenderoth	Conduct experiment to determine if study groups, clickers, individual responses to online questions improve students' grades and retention in Biology 180	<ul style="list-style-type: none"> Identify learning goals for Biology 180 that link to those for all 100/200 level courses Compare student performance Develop predictive model of droppers and low-grade recipients and track 	<ul style="list-style-type: none"> Drop in the failure rate Better scores on exams Identification of successful strategies for high-risk students Follow-up study Share information with dept.

* Although not part of the College of Arts & Sciences, the College provided assessment resources to Accounting and included Accounting faculty in all Arts & Sciences workshops and meetings.

FOUNDATIONS COURSES 2004-2006				
Department	Faculty	Project Summary	Assessment Plans	Outcomes
Chemistry 142/52/62 2004-2005	Phil Reid Tom Engel	Introduce clickers and clicker-based thought questions into lecture	<ul style="list-style-type: none"> Identify learning goals Track attendance Compare exam performance on clicker areas with previous non-clicker exam performance 	<ul style="list-style-type: none"> Increased attendance Improved performance on exams Increased student sense of class as learning community Increased faculty interest in new technologies
Cinema Studies (Comp Lit) 2005-2006	Albert Sbragia Jennifer Bean Yomi Braester Willis Konick Cynthia Steele James Tweedie	<ul style="list-style-type: none"> Revise the 301 and 400 gateway courses—adding learning goals, writing goals, and a shared instructional paradigm for the course. Meet with external film studies consultants to develop learning goals for majors Meet with others who teach film courses across campus Identify learning goals and creating a curricular map Conduct workshop on teaching film for undergrad programs 	<ul style="list-style-type: none"> Identify learning goals for program Identify learning goals for new courses—revised 301, Comp Lit 400—Intro to Theory of Film, and Comp Lit 312 Develop curricular map of Cinema Studies program Conduct classroom based assessment of new courses Track film students into other courses Develop performance-based assessment for majors 	In development
Earth & Space Sciences	Robert Winglee Walt Harris Bruce Nelson George Bergantz Kari Cooper Terry Swanson	<ul style="list-style-type: none"> Move lower division classes to distance learning formats beginning with ESS 102, 101, 106 Integrate VLE (Virtual Learning Environment) into regular upper level courses 	<ul style="list-style-type: none"> Identify learning goals Compare student performance Compare student satisfaction 	In development
Economics 2004-2005	Eugene Silberberg Haideh Salehi-Esfahani	<ul style="list-style-type: none"> Create web-based active-learning experiences for Econ 200 and 201 Conduct quizzes online 	<ul style="list-style-type: none"> Identify learning goals for 200 and 201 Add questions on methods to course evals 	<ul style="list-style-type: none"> Decrease in student satisfaction; modified original redesign Increase in student satisfaction Increase in conceptual understanding
2005-2006	Haideh Salehi-Esfahani	Add to library of web-based activities/exams for Econ 201	Continue to track student course evals and performance on exams.	In development

**FOUNDATIONS COURSES
2004-2006**

Department	Faculty	Project Summary	Assessment	Outcomes
English	Gillian Harkins Mark Patterson Leroy Searle Norm Wacker Bob McNamara Joan Graham Melissa Wensel Caroline Simpson Linda Ahern Carolyn Allen Anis Bawarshi	<ul style="list-style-type: none"> • Develop learning goals for the 200-level gateway course • Get departmental consensus on goals • Identify more cost-effective process for course • Assess course and feed back information into curriculum 	<ul style="list-style-type: none"> • Identify learning goals and send to faculty, keeping in mind the purpose of the course is to introduce students to the discipline: <ul style="list-style-type: none"> ○ Introduce students to basic historical and critical contexts that have shaped the development of English language, literatures, and cultures (CONTENT) ○ Reinforce a habit of close and careful reading practices (METHODS) ○ Improve writing • Track entering students to describe their college writing backgrounds • Develop assessment plan with faculty teaching in W and SP06 	In development
Jackson School 2004-2005	Anand Yang David Bachman Eight-member faculty committee	<ul style="list-style-type: none"> • Develop learning goals for 200-level gateway into all seven Jackson School tracks • Get agreement from all seven tracks to require gateway • Pilot course 	<ul style="list-style-type: none"> • Identify ways to assess learning goals 	<ul style="list-style-type: none"> • All seven Jackson school majors agree to require Foundations course • Requirement in place for students entering in 2006 • Portfolio plan designed
2005-2006	Anand Yang David Bachman Eight-member faculty committee	Assess new Foundations Course	<ul style="list-style-type: none"> • Conduct portfolio assessment of student work from winter Foundations Pilot • Conduct portfolio assessment of work from spring pilot 	In development
Physics 114/5/6 2004-2005	Daryl Pedigo Paula Heron	<ul style="list-style-type: none"> • Create hands-on experiences to be used as demonstrations in a larger class • Develop clicker questions • Working with PEG, develop pre/post concept tests 	<ul style="list-style-type: none"> • Identify learning goals for class • Use PEG results to assess 	

**FOUNDATIONS COURSES
2004-2006**

Department	Faculty	Project Summary	Assessment	Outcomes
Psychology 101 2004-2005	Michael Passer and three other lecturers in 101	Develop library of online active- earning experiences to teach key concepts	<ul style="list-style-type: none"> • Identify shared core learning goals • Build student assessment of activities into the activities • Compare student performance on concepts on exams with previous students' performance 	<ul style="list-style-type: none"> • Learning goals developed • High level of student satisfaction with each activity • Improvement in student performance • Increase in student self-reflection and consequent understanding of own level of knowledge • All subsequent Psych 101 faculty using activities developed
2005-2006	Michael Passer	<ul style="list-style-type: none"> • Continue tech support (30-40 hrs) • Add to library (release of spring class) • Present work to faculty 	Continue to attach student satisfaction/ reflection pieces to library entries	In development
Sociology 2005-2006	Julie Brines Kevin Mihata Undergrad Cmte	<ul style="list-style-type: none"> • Identify learning goals for major • Get consensus on the kind of Foundations Course consistent with goals 	Beginning ideas for new Foundations Course for major	In development
Women Studies 2004-2005	Judy Howard Full-time RA All faculty	Develop learning goals for WS 200, gateway into major	Presence of learning goals	Learning goals drafted and checked against goals for major
2005-06	David Allen Full-time RA	<ul style="list-style-type: none"> • Pull upper-level courses into learning goals • Assess new capstone w/senior portfolios • Assess new Women 200— Developed in previous year. 	Use senior portfolios to assess capstone against learning goals for major	In development

**CURRICULAR DEVELOPMENT
2004-2006**

Department	Faculty	Project Summary	Assessment Ideas	Outcomes
Art	Paul Berger Ellen Garvens Rebecca Cummins	Develop and pilot a large-lecture gateway course for photography, DX, and Visual Design majors	<ul style="list-style-type: none"> • Identify learning goals for the course • Use technology to assist in critique • Follow-up into second course 	<ul style="list-style-type: none"> • Learning goals identified and agreed upon by all faculty • Technology designed and ready for pilot
Atmospheric Sciences	Robert Wood Joel Thornton	<ul style="list-style-type: none"> • Develop a web-based and paper laboratory manual that details goals, equipment, methodology, and statistical tools required for each activity; provides exercises; and provides background material • Develop a document that details the use of chemical instrumentation deployed with meteorological instruments for air quality study 	<ul style="list-style-type: none"> • Identify learning goals for the course • Compare student performance in previous with performance in new version of course • Compare student satisfaction 	In development
Communication	Philip Howard	Develop a hands-on curriculum where students create and get air time for public service statements for political communication courses at the 300-level that can be scaled up to the 400-level.	<ul style="list-style-type: none"> • Identify learning goals for each course • Review of student work by CMU faculty outside the course 	Student work published

**LEARNING IN THE MAJOR
2004-2006**

Department	Faculty	Project Summary	Assessment	Outcomes
Cinema Studies (Comp Lit) 2005-2006	Albert Sbragia Jennifer Bean Yomi Braester Willis Konick Cynthia Steele James Tweedie	<ul style="list-style-type: none"> • Revision of the 301 and 400 gateway courses—adding learning goals, writing goals, and a shared instructional paradigm for the course. • Meeting with external film studies consultants to develop learning goals for majors • Meeting with others who teach film courses across campus • Identifying learning goals and creating a curricular map • Conduct workshop on teaching film for undergrad programs 	<ul style="list-style-type: none"> • Identify learning goals for program • Identify learning goals for new courses—revised 301, Comp Lit 400—Intro to Theory of Film, and Comp Lit 312 • Curricular map of Cinema Studies program • Classroom based assessment of new courses • Track film students • Develop performance-based assessment for majors 	In development
Dance	Betsy Cooper	Develop and “test” ways to assess learning goals in major	<ul style="list-style-type: none"> • Ask students to self-assess with learning goals in the major • Develop electronic portfolio and pilot 	Developing design for portfolio assessment
Geography	Rick Roth Suzanne Withers Michael Brown	<ul style="list-style-type: none"> • Add departmental learning goals to course evals • Continue Geography SOUL • Monitor/assess learning goals via capstone course and portfolios • Recommend curricular changes based on revision 	<ul style="list-style-type: none"> • Report on findings from Geography Study of Undergraduate Learning (SOUL) • Assess portfolios gathered in SOUL • Make recommendations 	Analysis of first-year interviews
Psychology	Ana Mari Cauce Beth Kerr Nancy Kenney Laura Little	<ul style="list-style-type: none"> • Reconsider and fine-tune department learning goals • Identify and study learning goals in place in individual courses • Map dept. learning goals across curriculum 	Delayed while chair search is conducted.	In development
Sociology	Julie Brines Kevin Mihata Undergrad Comte	<ul style="list-style-type: none"> • Identify learning goals for major • Get consensus on the kind of Foundations Course consistent with goals 	<ul style="list-style-type: none"> • Identify learning goals for program • Map curriculum to goals • Redesign gateway(s) 	Preliminary conversations with faculty on curriculum redesign

LEARNING IN THE MAJOR 2004-2006				
Department	Faculty	Project Summary	Assessment	Outcomes
Women Studies 2004-2005	Judy Howard Full-time RA All faculty	<ul style="list-style-type: none"> Develop new capstone to assess learning in major Create curricular map to learning goals Review/revise learning goals for major 	---	<ul style="list-style-type: none"> Developed new capstone Created curricular map of courses to learning goals Revised learning goals
	----- 2005-06	----- David Allen Full-time RA	----- <ul style="list-style-type: none"> Pull upper-level courses into learning goals Assess new capstone w/senior portfolios 	----- Use senior portfolios to assess capstone against learning goals for major

WEB-ENHANCED FOREIGN LANGUAGE INITIATIVE 2004-2006				
Department	Faculty	Project Summary	Assessment	Outcomes
Spanish	Paloma Borreguero, Kristee Boehm, Graduate students	<p>Create a series of first-year hybrid language courses and online learning activities for Span 110 and 103. Transferring the portion of the language course devoted to rote tasks onto a self-instructional but guided web-based learning environment, frees up time for communicative application in the classroom. In addition, the hybrid course model would further allow one teaching assistant to offer two language sections rather than only one section, making the model highly cost effective.</p> <p>In 2005-06, add a second year hybrid language course—Span 210—to the mix.</p>	<p>Compare four hybrid sections of Spanish 110 with traditional sections of 110.</p> <p>Track 110 students into Spanish 203 and compare.</p> <p>Model German and Japanese pilot projects from best practices learned from Spanish, as well as from approaches noted in the literature on engaging and educating students in learning vital components of language and culture to become successful language learners.</p>	<ul style="list-style-type: none"> Effective use of Moodle as a learning management tool Improved or same level of student learning Improved or same level of student satisfaction

**WEB-ENHANCED FOREIGN LANGUAGE INITIATIVE
2004-2006**

Department	Faculty	Project Summary	Assessment	Outcomes
Japanese	Kaoru Ohta, Graduate students	Create a series of first-year hybrid language courses and online learning activities for Japanese 112 and 113. Transferring the portion of the language course devoted to rote tasks onto a self-instructional but guided web-based learning environment, frees up time for communicative application in the classroom. In addition, the hybrid course model would further allow one teaching assistant to offer two language sections rather than only one section, making the model highly cost effective.	As above	<ul style="list-style-type: none"> • Effective use of Moodle as a learning management tool • Improved or same level of student learning • Improved or same level of student satisfaction
German	Manfred Bansleben, Graduate students	<p>Create a series of first-year hybrid language courses and online learning activities for German 101 and German 111. Transferring the portion of the language course devoted to rote tasks onto a self-instructional but guided web-based learning environment, frees up time for communicative application in the classroom. In addition, the hybrid course model would further allow one teaching assistant to offer two language sections rather than only one section, making the model highly cost effective.</p> <p>In 2005-06, add a second year hybrid language course—German 201—to the mix.</p>	As above	<ul style="list-style-type: none"> • Effective use of Moodle as a learning management tool • Improved or same level of student learning • Improved or same level of student satisfaction

**4 X 4 WRITING
2004-2006**

Department	Faculty	Project Summary	Assessment	Outcomes
2004-2005 American Ethnic Studies, American Indian Studies, Anthropology, Mathematics, Scandinavian, and Speech and Hearing	Rick Bonus Michelle Habell- Pallan Sonnet Retman Steve Sumida Charlotte Cote Celia Lowe Ann Anagnost Janelle Taylor Lorna Rhodes John Palmieri Jack Lee Jan Sjavik Andrew Nestingen Marianne Stecher- Hansen la Dubois Judith Stone- Goldman Leslie Olswang	The 4x4 Initiative supports faculty in developing writing-integrated courses. The initiative engages faculty from up to four departments at a time, with up to four faculty from each of the participating departments. These faculty members work together through a set of workshops to plan new ways of integrating writing into their undergraduate courses. Faculty from participating units take different paths to address their department's writing needs: some focus on a single set of existing undergraduate courses; others develop new undergraduate courses designed to fit within an existing department curriculum; and others create an unrelated set of courses to be taught by individual faculty members.	<ul style="list-style-type: none"> • Identify learning goals for program • Course evaluation tracks individual units • Faculty reflections on the experience • Follow-up with faculty participants • Count number of students, faculty, and departments affected • Track spillover: new faculty in repeat departments 	<ul style="list-style-type: none"> • Changes in writing practices of 34 faculty from 11 departments • 3000 students' learning experiences directly affected by changes (annual enrollments in courses revised) • Course evaluations and analysis of faculty reflections show that the program has been extremely well-received by faculty
2005-2006 Cinema Studies, Dance, Philosophy, and Psychology	Ann Baker Ronald Moore Michael Rosenthal William Talbott Jennifer Bean Yomi Braester Albert Sbragia Cynthia Steele James Tweedie Jane Brown Steve Buck Ellen Covey Jaime Olavarria Betsy Cooper Jennifer Salk Mark Haim Jurg Koch			

**Odegaard Writing and Research Center
2004-2006**

Department	Faculty	Project Summary	Assessment	Outcomes
All	Laura Black	Provide a centrally-located writing center for undergraduates that provides them with one-stop access to library resources.	<ul style="list-style-type: none"> • Track number of visits • Track number of repeat visits • Track time usage • Develop short form to assess satisfaction • Pilot form to capture overflow • Assess tutor training 	<ul style="list-style-type: none"> • All appointments filled • Evaluation forms developed • Developing form to capture overflow