

**List of Publications, Conferences, and Internal Presentations
By Faculty and Staff of the
Archibald Bush Foundation | University of Minnesota
Enhancing Student Learning Through
Innovative Teaching and Technology Strategies Program**

Crookston

Publications

Grave, Marilyn. "Criterion Three: Student Learning and Effective Teaching." *Chapter 3, Self-Study Report for the Higher Learning Commission of the North Central Association of Colleges and Schools*. (pp. 86-151) University of Minnesota, Crookston, February 2006.

Conferences

Crawford, David. "A Series of Formative Classroom Assessment Techniques Used in Accounting Principles Courses." American Accounting Association, 46th Annual Meeting, Midwest Regional. Chicago. 30 March, 2006.

Grave, Marilyn. "Designing and Building a System for Documenting and Analyzing Assessment of Student Learning Activities." Institutional Showcase Presentation, 112th Annual Meeting of the Higher Learning Commission, North Central Association of Colleges and Schools - "Leading for the Common Good". Chicago. 21-24 April, 2007.

Myers, Ken. "Situational Learning: Assessing and Developing Student Skills in Synthesizing Information from an On-The-Job Situation and Reflective Problem Solving." Midwest Association of Hospitality Educators Conference. Minneapolis. February, 2007.

Sedaie, Behrooz. "The Effect of Graphs and Computers on Students' Achievement in College Introductory Economics Courses." Midwest Economic Association, 68th Annual Meeting. Chicago. 19 March, 2004.

Sedaie, Behrooz. "The Effect of Principles Courses on Students' Attitude Toward Economic Literacy." Midwest Economic Association, 69th Annual Meeting,

Milwaukee. 12 March, 2005.

Sedaie, Behrooz. "The Effect of Technology Enhanced Collaborative Learning on Students' Achievement in College Level Introductory Microeconomics Courses." Midwest Economic Association, 71st Annual Meeting, Minneapolis. 24 March, 2007.

Thompson, K., & Johnson, K. "Practical applications of classroom concepts for real world clients." The Collaboration for the Advancement of College Teaching and Learning November Conference, Minneapolis, Minnesota. November, 2007.

Internal Presentations

Crawford, David. "Students' Academic Efforts and Their Perceptions Regarding Institutional Standards and Expectations." University of Minnesota, Crookston. 16 May, 2006.

Myers, Ken. "Situational Learning as a Model for Innovative Teaching for Internships at UMC." University of Minnesota, Crookston. 21 December, 2006.

Sedaie, Behrooz. "The Effect of Technology Enhanced Collaborative Learning on Students' Achievement in College Level Introductory Microeconomics Courses". 21 December, 2006.

Duluth

Publications

Carlson, Jane A. K. "University/School Partnerships in Teacher Education Programs" published in *Journal of Physical and Health Education*. Summer 2007, pp 6-11.

Abstract. Teacher preparation programs vary widely from university to university. At one end of the continuum is the traditional model consisting of an on-campus methods course in isolation of field experience. At the other end is the popular professional development school (PDS) consisting of a partnership between a university and a school. At first glance, these two models seem to be in stark contrast to one another; however, a PDS model can co-exist within a more conventional framework. How does a traditional physical education teacher education program transition towards a PDS model? This poster gives practical advice how teacher educators at the University of Minnesota Duluth created a university and school partnership within a traditional model of teacher preparation for physical education specialist (grades K-12) in a four-year undergraduate bachelor degree program.

Doorn, David, and Maureen O'Brien. "Assessing the Gains from Concept Mapping in Introductory Statistics." *International Journal for the Scholarship of Teaching and Learning*. Vol 1, Number 2, 2007.

Abstract. In an effort to improve active learning in introductory statistics, we introduce the use of concept mapping techniques as part of the course. While previous papers have touted the use of this and other interactive teaching methods in statistics education, we add to this literature by providing additional assessment of its efficacy. This comes through an experimental design that involves a single instructor teaching two sections of the same statistics course over the same semester. Both cover the same material in the same way with the exception that concept mapping is used in one section, but not the other. Assessment of learning outcomes is done through the use of pre-tests and post-tests of understanding of statistical concepts. We also track changes in student's study habits over the semester through additional surveys. We find only weak evidence that concept mapping is effective in aiding student learning of statistics.

Kuhlke, Olaf. Editor for book *Northland Geographies: Nature, Society and the Economy in Ely, MN* Edwin Mellen Press January 2008

Latterell, C.M. (2005). "The study skills of Calculus I college freshmen: A thought piece and essay data." *The Virginia Mathematics Teacher*, 32 (1), 46-47.

Zuolkernan, I. A., Allert, J. and Qadah, G. Z. "Learning Styles of Computer Programming Students: A Middle Eastern and American Comparison." *IEEE Transactions on Education*, Vol 49, No. 4, Nov. 2006.

Abstract. Although there are many studies addressing the relationship of learning style to outcomes in engineering courses, few have attempted direct cross-cultural comparisons. This study investigates similarities and differences in the learning styles of computer science and engineering students at a Middle Eastern institution and an American university in the Midwestern United States. Comparative data on student learning style profiles and course outcomes suggest that, despite vast cultural differences, strong similarities exist between learning styles of these students. Seemingly, a consistent pattern in how these students learn across cultures also exists. These findings have significant implications for the creation of globally effective teaching materials

Conferences

- Allert, James. "Using Student Learning Data to Redesign Computer Science I". Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.
- Allert, James. "Do Learning Styles Matter?" Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.
- Carlson, Jane A. K. "Partnership in the Schools – Transitioning Away from the Traditional." Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.
- Carlson, Jane A. K. *Partnerships in the Schools – The Missing Link*. Presentation at the Minnesota Association of Health, Physical Education, Recreation and Dance State Conference. Alexandria MN October 29, 2007.
- Carlson, Jane A. K. *Partnership in Schools-Transitioning Away from the Traditional*. Presentation at the American Alliance of Health, Physical Education, Recreation and Dance National Conference. Baltimore MD March 14-17, 2007
- Davis, Jason, Charlene Harkins, John Kowalczyk, Steve Holtz, Joseph Johnson, Chad Pierson, LeAne Rutherford, Angela Sharp. "Clicking into Bloom: Realizing the Learning Potential in Personal Response Systems." Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.
- Doorn, David, and Maureen O'Brien. "Assessing the Gains from Concept Mapping in Introductory Statistics" Joint Statistics Meeting of the American Statistics Association. Seattle, WA. 7-10 August, 2006.
- Doorn, David, and Maureen O'Brien. 76th Annual Meeting of the Southern Economics Association. Charleston SC, 18-21 November, 2006

Glisczinski, Dan. *Curriculum for Conscientization*. Presentation at the Midwest Qualitative Conference. University of St. Thomas, Minneapolis MN April, 2007.

Glisczinski, D. "Transformative College Curriculum: A Research-Based Model For Meaningful Degrees of Understanding". INTED (International Technology, Education, and Development) Conference, March, 2008 in Valencia, Spain.

Abstract. Traditionally, institutions of higher education have been hard at work informing students on how to be effective professionals and citizens. Frequently, this has taken the form of instructing students in existing occupational skill sets supplemented by general liberal educational conversancy. Yet, in a postmodern, super-connected world in which change is the reliable constant, informative education is of basic, but limited value. Rather than merely working harder, higher education might insightfully choose to work smarter—by engaging in transformative education, which employs curricular models that not only inform, but also transform epistemological assumptions. In doing so, faculty design curriculum that scaffolds students in performing as critically reflective, collaborative, perspective-taking global decision makers in midst of novel and demanding environments. This study offers a literature-based and empirical research-based higher education curriculum model for transformative learning, designed to support faculty and students across disciplines in developing as not only informed, but transformed professionals and global citizens. This transformative learning model for higher education is based on the research of Mezirow (1970), Herbers (1988), Brookfield (2000), Kolb (1984), Kegan (2000), Maslow (1971), Habermas (1984), Bloom (1976), and Wiggins & McTighe (1998).

Glisczinski, D. "Critical Incidents, Collaboration, and Cyber-Reflection in College". INTED (International Technology, Education, and Development) Conference, March 2008 in Valencia, Spain.

Abstract. For years, higher education faculty have been using Brookfield's (1995) Critical Incident Questionnaire (C.I.Q.) in courses, in order to better understand the role that reflective practice plays in improving self-regulated, reflective college learning. And for years, C.I.Q. use has required a great deal of administrative work from teachers committed to transformative learning. Yet with recent advancements in Wiki technology, making use of the powerful C.I.Q. has become increasingly collaborative and engaging for faculty and students alike. This research project explains the theoretical basis, technological aspects, and curricular convictions that support higher education faculty in learning about powerful student learning through Wiki-based C.I.Q. use in higher education.

Hassan, Nik. *Testing the Idea of Emergent IT Literacy in IS Education*
AIS SIG Education IAIM Conference, Montreal Canada, Dec 7-9, 2007.

Abstract. This paper proposes and tests a novel conception of information technology (IT) literacy based on anthropological literacy studies. This concept of "Emergent IT literacy" describes literacy with IT, not as skills to be gained, but as a social practice of controlling the environment with the help of technology. Emergent IT literacy provides a cogent foundation for understanding how students learn and accomplish their tasks using technology. An experiment performed by an introductory information systems (IS) class lends support to this concept by showing that the levels of informal social practices with IT impacts performance with technology more than inherent student capabilities.

Jenson, Jill. "Promoting Reflective Learning Through Portfolio Use in Composition." Sakai Conference with Open Source Portfolio. Vancouver BC. 30 May – 2 June, 2006.

Jenson, Jill and Paul Treuer, Encouraging Self-Regulated and Reflective Learning Through Electronic Portfolio Use in Composition. Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Abstract. This session briefly reviews implementation of the University of Minnesota's electronic portfolio on the Duluth campus as a freshman composition requirement and the initial lack of student reflection resulting from its use. A study undertaken to improve the students' portfolios indicates that surveying students about their process of writing can lead to awareness of self-regulation techniques and intentionally prompting them to be more reflective thinkers can improve the quality of their portfolio reflection statements.

Johnson, Joe, and Bilin Tsai. "Developing Reflective Faculty and Independent Learners." Great Lakes Regional Meeting of the American Chemical Society. Milwaukee, WI. 31 May – 2 June, 2006.

Kuhlke, Olaf. *Government Policy, Migration Flows and Recruitment Agency Location in Sri Lanka: Implications for Tsunami-Impacted Regions* Presentation at the Applied Geography Conference. Indianapolis IN October, 2007.

Millsagle, Duane. "Comparing Metacognitive Learning Strategies Among Undergraduate Students in Face-to-Face and WebCT Online Delivered Sport Psychology Courses." American Alliance of Health, Physical Education, Recreation and Dance National Conference. Baltimore, MD. 14 -17 March, 2007.

Millsagle, Duane. "A Study of Meta-Cognitive Learning Strategies Among Undergraduate Students and Between Courses Delivered Face to Face and Online". Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Mongan-Rallis, Helen. So Many Tools, So Little Time. Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Rubin, Justin "Virtual Instrument Sequencing", UMD VDIL Colloquium, Oct 10, 2007.

Abstract. As part of my investigation, I worked with students on developing a music theory website that would allow them to practice their class topics individually at their own pace and allow them time for self-reflection regarding their exhibited knowledge through practice interactive exams. My presentation demonstrated what materials I developed in response to student surveys and how effective it was in creating a better learning environment.

Smith, Shelley and LeAne Rutherford. *Clicking into Bloom: Realizing the Learning Potential of Clickers*. Professional and Organizational Development Conference. Pittsburgh PA October 25-27, 2007.

Abstract. Clickers (personal response systems) promote active learning by directly engaging students with course content, providing immediate learning feedback to students, and allowing instructors to check on mastery of both content and concepts. But the system is only as good as the questions it poses to students. In this session, and using Bloom's Revised Taxonomy, participants will have a chance to use clickers as they analyze questions and purposely develop and categorize their own questions to decide if clicker technology can be used to lead students to critical thinking through using Bloom's Taxonomy?

Vanderheiden, Steve. "Connecting Student Outcomes to Exam Preparation Strategies: Promoting Self-Reflective Learning", *2007 Meeting of the Midwest Political Science Association*, Chicago, IL April 12-15, 2007.

Tsai, Bilin P. "Designing a Chemistry Building to Increase Student Performance in the Laboratory". 233rd National Conference of the American Chemical Society, Chicago IL March 25-29, 2007.

Abstract. The opening of a new laboratory science building at the University of Minnesota Duluth in July 2005 was the culmination of nearly ten years of planning. These discussions allowed the faculty to examine and articulate the goals of our instructional laboratory program. These goals, in turn, drove the design of new teaching labs for general, organic and bio-chemistry. Several curricular issues emerged including:

- Increase expectations to improve the technical abilities and learning experience of our students;
- Promote their experimental initiative, inquiry and independence;
- Integrate more instrumentation into experiments;
- Increase TA effectiveness and preparation;
- Integrate lecture and lab more thoroughly; and
- Comply with all safety regulations.

During the 2005-2006 academic year, over 2000 chemistry students completed laboratory courses in a new \$33 million facility. We were able to evaluate the impact of our design decisions in the curricular goals listed above.

Tsai, Bilin. *Reflective Learners and Student Achievement*. Presentation at the National Conference of the American Chemical Society. Chicago IL March 25-29, 2007

Abstract. The University of Minnesota is funded by the Bush Foundation to enhance student learning through a scholarly and collaborative approach that includes innovative teaching strategies and assessment. The focus of the work on the Duluth Campus is to promote independent and self-regulated learners and reflective instructors. This study involved students in a physical chemistry course. Student surveys were designed to prompt student self assessment associated with quizzes and exams, probe their study strategies and priorities especially in response to self assessment and identify factors that have a detrimental impact on student success. In addition, these surveys helped the instructor modify course structure and activities in order to increase student learning.

Tsai, Bilin. *Post-Occupancy Evaluation of a Leading-Edge Model for Teaching Labs*.

Presentation at the 2007 Tradeline Conference on College and University Science Buildings. Albuquerque, NM October 3-5, 2007.

Abstract. The University of Minnesota Duluth has two year's worth of experience with a new teaching lab design tailored to meet leading-edge curricular goals for general, organic, and biochemistry courses. Bilin Tsai details special design features that integrate and support student lab prep work, team-style laboratory experiments, data analysis, and classroom discussion. In addition, she evaluates lab design successes and areas that need improvement with respect to achieving independent, experimental learning, increased use of instruments, greater TA effectiveness, development of strong communication and presentation skills, and greater integration of lecture and lab-based learning.

Versnik-Nowak, Amy. "CPR: Resuscitating critical thinking using Calibrated Peer Review". American Alliance for Health, Physical Education and Recreation (AAHPERD) 123rd Annual Convention and Expo, April 8-12, 2008

Abstract. Health consumers are challenged at every turn with life choices, which makes critical thinking skills vital. Technology can enhance the way health educators promote critical thinking skills among their students. Calibrated Peer Review (CPR) is one such web-based technological tool, which facilitates writing and critical thinking skills. CPR facilitates a peer review process and enhances students' abilities to identify quality critical thinking and writing. Not limited to a specific subject matter, CPR can be applied to any topic and can be used in multiple ways. Learn how you can use CPR to enhance critical thinking and other skills in your health education classrooms.

Internal Presentations

Allert, James. UMD Instructional Development Service Workshop 10/4/05 on the topic "Do Learning Styles Make a Difference?"

Allert, James (and other Bush grant recipients). University of Minnesota Inter-Campus Conversations on Innovative Teaching, Nov. 1, 2005. Sponsored by the Bush Foundation. "Topic: Learning Style Awareness and the Reflective Process for Improving Large-Enrollment Classes."

Allert, James, UMD Visual and Digital Imaging Lab Seminar 12/2/05 "Visualizing Student Learning in Computer Science I."

IDS Colloquium I: *Creating Independent Learners* Nov 16, 2005

- James Allert, "Creating Self-Directed Learners and Reflective Practitioners"
- Mark Harvey, "On-line vs In-Class Discussion"
- Lynn Bye, "Enhancing Student Learning Through Innovative Teaching and Technology Strategies"
- Duane Millslagle, "Metacognitive Strategies of Undergraduate Students"

IDS Colloquium II: *Branching Out* May 2, 2006

- Jill Jenson, “Promoting Reflective Learning Through ePortfolio Use in Composition”
- Carmen Latterell, “Student Study Skills”
- Chad Pierson, “Personal Response Systems as a Pathway to Self-Regulation and Presence as a Predictor of Performance”
- Justin Rubin, “The Value of Grading to Help Students Better Prepare for Subsequent Classwork”

IDS Colloquium III: March 29, 2007. Jason Davis, Charlene Harkins, John Kowalczyk, Steve Holtz, Joseph Johnson, Chad Pierson, LeAne Rutherford, Angela Sharp, *Clicking into Bloom: Realizing the Learning Potential in Personal Response Systems*.

- Presentations at the biweekly Bush faculty meetings were made by
 - Justin Rubin, Music
 - Charlene Harkins, HPER
 - Nik Hassan, FMIS
 - Bilin Tsai, Chemistry
 - Marshall Hampton, Math and Statistics
 - Jane Carlson, HPER
 - John Kowalczyk, HPER
 - Dan Gliszinski, Education
 - Steve Vanderheiden, Political Science
 - Marty Sozansky, Composition
 - Nik Hassan, FMIS
- IDS Workshop on September 25, 2007 on the *Use of Clickers in the Classroom*
- Jim Allert, Scot Halverson
Making Tutorials for CS Classes with Adobe Captivate
UMD Visual and Digital Imaging Lab Colloquium on October 2, 2007
- Justin Rubin
Virtual Instrument Sequencing
UMD Visual and Digital Imaging Lab Colloquium on October 10, 2007
- Rob Wittig
Weblogs and Podcasting to Support International Collaboration
UMD Visual and Digital Imaging Lab Colloquium on October 30, 2007

IDS Workshop scheduled for December 4, 2007 on 4 Bush Faculty projects.

Johnson, Joe. “On the use of Personal Response Systems for pharmacy students on two campuses (TC and Duluth).”

Morris

Conferences

Alsaker, Brady, Katherine A Benson, Roger P Boleman, Karen M Cusey, Pamela G Gades, Paul Z Myers, Pamela A Solvie, & Engin A Sungur. UMM Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Berberi, Tammy. "Disabilities and Foreign Language Learning: A Roundtable." Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Solvie, Pamela A., and Molly Kloek. Society for Information Technology & Teacher Education 17th International Conference. Orlando Florida. 20-24 March 2006.

Solvie, Pamela A., and Engin A. Sungur. "Concept Maps/Graphs/Trees/Vines in Education," The 5th WSEAS International Conference on E-ACTIVITIES. Venice, Italy. 20-22 November 2006.

Solvie, Pamela A., and Engin A. Sungur. "The Use of Concept Maps and Graphs in the Instructional Process." Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Internal Presentations

Berberi, Tammy. "Disabled Students in Our Classrooms." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.

Berberi, Tammy. "Worlds Apart: Disability and Foreign Language Study." Inter-Campus Conversations on Innovative Teaching. 1 November 2005.

Boyd, Sylke. "Computer Modeling of Materials in Physics." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.

Boleman, Roger, Karen Cusey, Pam Gades. "State of Technology Enhanced Learning at UMM." UMM Fall Faculty Retreat. August 21, 2007.

- Bremer, Peter, Matt Conner, Pam Gades, Roger Boleman, and Karen Cusey,. "State of Technology Enhanced Learning (TEL)." UMM Fall Faculty Retreat: Enhancing Our Academic Environment. Alexandria, Minnesota. 21-22 August 2006.
- Gades, Pam. "Course Tools: New Initiative." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.
- Gercken-Hawkins, Becca. "Using Technology to Shape and Support Learning Communities." UMN TEL Seminar Series. 7 December 2005.
- Kahng, Byungik. "Using Mathematica on Teaching Calculus to Diverse Learners." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.
- Kahng, Byungik. "Programmatic Change with Learning Technologies" UMN TEL Seminar Series. 5 October 2005.
- Kloek, Molly. "Learning styles." Learning Styles Resources, and Teaching to Diverse Learning. 3 October 2006. <www.morris.umn.edu/TEL/>.
- Machkasova, Elena, and Nic McPhee. "Dynamic Web Page Teaching Tools." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22, August 2006.
- Myers, Paul. "Reflection Logs for Research in Science (BLOGS)." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.
- Solvie, Pamela A. "Using Technology Tools to Engage Students with Multiple Learning Styles in a Constructivist Learning Environment." Inter-Campus Conversations on Innovative Teaching. 4 April 2006.
- Solvie, Pamela A., and Engin A. Sungur. "Concept Maps." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.
- Thorson, Greg. "Clickers and Wikis: New Opportunities for Student Participation Through Technology." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.

Twin Cities

Publications

Brakke, Mary, Kevin Smith, Paul Baepler, and J.D. Walker (2006). "Using problem based learning to enhance students' motivation to learn." *Creative College Teaching Journal*. (3) 1, 4-15.

Abstract: This article examines the authors' use of problem-based learning (PBL) in a large-enrollment life-science course at the University of Minnesota. The course is taken by students throughout the university, and, as such, student interest in the subject and preference for learning format vary widely. Prior to implementing PBL in the course, a traditional lecture format was used to provide an overview of fundamental biological concepts. Although pass/fail rates for the course were acceptable, student engagement in the class was low, work quality was marginal, and attendance was problematic. The authors speculated that the underlying problems with student performance were primarily attitudinal and specifically related to a lack of interest and motivation to learn. To address these factors, the authors identified the need to enhance the relevancy of material and to increase the amount of active learning within the classroom. The study chose to adopt PBL as a means to achieve these learning objectives because the problem-solving framework creates opportunities to emphasize the personal relevance of material and to engage students in an active process that inspires interest and motivates learning. This article explores the degree of success in adopting PBL.

John Chilton and Maria Gini, "Using the AIBOs in a CS1 course," AAI Spring Symposium on "Robots and Robot Venues: resources for AI education", *Technical Report SS-07-09*, AAI Press, pp 24-28, 2007.

Abstract: We describe an experiment that we have conducted in our CS1 course, where we used the robot dogs AIBO for a laboratory assignment. We briefly outline the course objectives, motivate the choice of using robotics and, in particular, of using the AIBOs in the course, and provide details on the software we developed for the lab assignment.

Cotner, Sehoya, Paul Baepler, Anne Kellerman (in press). "Scratch this!: The IF-AT as a technique for stimulating group discussion and exposing misconceptions." *Journal of College Science Teaching*.

Abstract: This study (a) documents the use of the Instant Feedback Assessment Technique (IF-AT) as a group-centered activity in a large-lecture environment, as part of a larger project supported by the Archibald Bush Foundation; and (b) evaluates student perceptions of IF-AT utility. The authors identify a set of "best practices" and suggestions for implementing IF-AT quizzes in large lecture courses.

Robinson, Julia, Valerie Ruhe, and Marc Beitz. (in press). "The scholarship of teaching and learning: Negotiating multiple perspectives on course redesign to promote student engagement." Annual Meeting of the Scholarship of

Teaching and Learning Conference. London, UK. 17 May 2006. *Annual International SoTL Conference Proceedings, Volume 3*. London, UK: The Educational Development Centre at City University.

Abstract: The goal of Architecture 3711 at the University of Minnesota is to provide a critical understanding of the environmental design professions, especially architecture, from the perspective of socio-cultural issues. Although most design practitioners see themselves as socially oriented, the values of the architectural profession often conflict with other social values. This course exposes students to the dilemmas faced by designers due to these value conflicts. This paper illustrates how multiple perspectives on the course (instructor, teaching assistants, consultants and students) permitted redesign to promote student learning. The paper is framed by diagrams of the instructional views at beginning and mid points, and addresses the conceptual changes from multiple perspectives. It concludes with a model of how survey data, qualitative notes of team meetings, theory of teaching and learning and personal reflection will continue to effect ongoing change during the remainder of this grant project funded by the Archibald Bush Foundation.

Ruhe, Valerie, Julia Robinson, and Sue Wick. (in press). “Designing research: The scholarship of teaching and learning in large lecture courses.” Annual Meeting of the Scholarship of Teaching and Learning Conference. London, UK. 17 May 2006. *Annual International SoTL Conference Proceedings, Volume 3*. London, UK: The Educational Development Centre at City University.

Abstract At the University of Minnesota (USA), faculty from a broad range of disciplines have engaged in a campus-wide initiative to redesign large lecture courses under a grant from the Archibald Bush Foundation. These faculty members, leading 12 course redesign teams, have addressed the barriers to student learning in large classes by adopting a variety of interventions intended to enhance reflective and responsible learning and student engagement in large lecture classes. To evaluate these interventions, the ITTS grant consultants adopted design-based research (DBR), an emerging paradigm for educational inquiry (The Design-Based Research Collective, 2003). This new research paradigm uses mixed methods to determine the success of theory-based innovations in educational settings. In this paper, we will focus on two large lecture courses at the University of Minnesota—Biology 1001 (Introductory Biology I: Evolutionary and Ecological Perspectives) and Architecture 3401.

Walker, J.D., Paul Baepler, Brad Cohen. (in press) “The SoTL paradox: Results without rewards.” *College Teaching*.

Abstract: Since 2005, the University of Minnesota’s Twin Cities campus has partnered with the Archibald Bush Foundation to improve student learning specifically in large enrollment courses. As one of its core goals, the partnership has a mandate to “foster a scholarly and collaborative approach to addressing student learning issues” Through this program and through a commitment to repositioning the advancement of teaching in a scholarly framework, the University has begun to recognize the research value of teaching and learning. In this essay, we examine how we motivated and supported faculty members from across a research-intensive university to engage with SoTL despite the lack of significant institutional changes. The fact is, with relatively little compensation and no evident shift in the reward structure, faculty have committed to deep engagement with SoTL. We define full engagement with SoTL as involving three dimensions: 1) Engaging with Scholarship, 2) Putting Scholarship into Action, 3) Contributing to Scholarship.

Zuiker, Virginia. S., Valerie Ruhe, Brad Cohen, Megan Lundberg, Clinton Gudmunson, and J. Egge. "Using case studies in large enrollment courses: A comparison of two methods." In D.C. Bagwell (Ed.), *Proceedings of the Association for Financial Counseling and Planning Education*, 127.

Abstract: Our particular course, Personal and Family Finances, faces challenges common to large courses where students come from a variety of backgrounds, majors, interests, and abilities. Our design task was focused on the implementation of formative case studies. Our research questions ask whether students prefer case studies to be integrated with other forms of teaching or whether they prefer stand-alone case studies and which of the two methods is more effective. All significant differences in the survey data favored integration of the case studies with other material rather than as a stand-alone method.

Conferences

Beitz, Marc, Julia Robinson, and Valerie Ruhe. "The Scholarship of Teaching and Learning: Incorporating Faculty Conceptions and Other Perspectives on Course Redesign to Promote Student Engagement." London SoTL 6th Annual International Conference. London, England. 18-19 May, 2006.

Brakke, Mary, and Kevin Smith. *Evaluation of Problem-Based Learning in a Non-majors Course*. Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Abstract: For our undergraduate course in plant science for non-science majors, we collected data on student demographics, expectations for the course, interest in the issues covered, reaction to approaches used and student attitudes toward studying. To characterize student engagement with course material, we used the abbreviated form of the Approaches to Studying Inventory (ASI, Entwistle and Ramsden, 1983) and we used the Intrinsic Motivation Inventory (IMI, Ryan 1982) to assess the effect of interventions on student interest/intrinsic motivation and other aspects of self-regulation. A majority of students felt the issues presented held personal relevance and interest. Of the approaches used, *PBL without a group project* was the most effective in helping students understand concepts and also in motivating their learning. Lack of difference in intrinsic motivation, the pure satisfaction of engaging in a particular activity, suggests that the approaches used failed to alter students' enjoyment of the material studied. The results suggest that intrinsic motivation and orientations to learning may be relatively stable dimensions that do not change in the short-term. Other factors may have influenced these results including students' inability to distinguish between approaches, the length of time required to affect intrinsic motivation and confounding factors such as the nature of issues and the point of time during the semester.

Chen, Amy, Kent Kirkby, Paul Morin, and David Rapp. "Assessing the Effectiveness of Different 3-D Map Styles." Geological Society of America.. 22-25 October, 2006.

Abstract: Anaglyph maps are increasingly being incorporated into introductory geology courses as a means to convey landscapes in stereo as three-dimensional surfaces. Although these maps do appear to engage students more effectively than traditional topographic maps, there has been limited research to quantitatively measure differences in the effectiveness of different anaglyph map styles. In particular, we were interested in evaluating the relative effectiveness of stereo contour maps and gray-scale shaded relief maps that lack contour lines. In many cases, contour lines appear to confuse students more than they help students visualize the land surface. To evaluate this idea, students were asked to draw the path of water flow on two types of stereo anaglyph maps: anaglyph maps made with contour lines and gray scale anaglyph maps that lacked contour lines. The study results confirm that contour lines can adversely affect students' perception of water flow, but also show that gray scale maps are not a perfect panacea. Gray scale maps foster their own set of misconceptions about water flow so instructors need to be aware of the misconceptions inherent to each map style. The results of the study are not limited to misconceptions about water flow, but provide rich insights into how students use maps to visualize land surfaces.

Chen, Amy, Kent Kirkby, and Paul Morin. "Uphill Water Flow - An Example of The Crucial Role of Students' Prior Knowledge in Geoscience Education." 2006 American Geophysical Union. 11-15 December 2006.

Abstract: Instructors of large geoscience undergraduate class seldom have the time to identify student misconceptions and are often forced to assume a certain base level of student knowledge upon which the course material is built. Students' prior knowledge and misconceptions can greatly hinder their acquisition of new expertise and often result in short term rather than long term retention of course concepts. As an example, the idea that water flows downhill is one of the simplest concepts we have in Earth Science. A logical, familiar and easily demonstrated concept, it seems a safe assumption that students already know, or will readily accept, that water flows downhill. Yet a recent study of students' map interpretation revealed a remarkable suite of often deeply-held misconception regarding surface water flow. Although the study's original goal was to measure the relative effectiveness of anaglyph and traditional topographic contour maps in conveying the geometry of the land surface, post-study interviews of participating students discovered many misconceptions about surface water flow and factors such as elevation, earth rotation, distance to a large water body, and compass directions. While it is still unclear how these basic misconceptions impair students' ability to grasp other concepts in an introductory geology course, our interview results demonstrate that assuming students and instructors share common base level knowledge is surprisingly risky.

Cotner, Sehoya, Bruce Fall, Sue Wick, Kent Kirkby, Amy Pagen Chen. *Changing Minds: Identifying, Challenging, and Correcting Misconceptions*. Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Abstract: Misconceptions pose significant hurdles to student learning in any field, but are particularly important in introductory science courses. A combination of unfamiliar subject matter, widely-held fallacies, and an immense gap between faculty and student backgrounds provides fertile ground for breeding misconceptions. This workshop will examine ways to identify, challenge and correct student misconceptions. Although workshop examples will focus on the earth and life sciences, the methods presented can be used in any discipline.

Fall, Bruce, Sehoya Cotner, Mark Decker, Paul Baepler, J.D. Walker, Sue Wick. "Do Instant Feedback Techniques Improve the Student and Instructor Experience in Introductory Biology Courses?" 2007 American Society for Cell Biology 47th Annual Meeting. Washington, D.C., 1-5 December, 2007.

Abstract: Use of scratch-off Immediate Feedback Assessment Technique (IF-AT) forms and classroom response systems (clickers) provides students with instant information about whether they grasp class concepts or need further work on a topic to master it. We have used the IF-AT frequently throughout the semester in four introductory biology classes; in three of these, students worked on IF-AT questions in small permanent groups, and in one class, students alternated between IF-AT forms and clickers each week. IF-AT questions and most clicker questions required the level of analysis students would need to answer exam questions, and sometimes were even more difficult than exam questions. In a first-day survey in two classes, up to 29% of students indicated that they were uncomfortable and/or unenthusiastic about taking the course, which fulfills a requirement for liberal education credit. In spite of this initial attitude of reluctance, instructors and classroom visitors noted a high energy level among students when groups were asked to answer either form of instant feedback question. At the end of the semester, students in all four classes answered survey questions about various class activities, including instant feedback techniques. The results indicate that students appreciated prompt feedback on how well they understand course material, enjoyed the group interaction and opportunities to learn from each other, and continued to like instant feedback activities and take them seriously throughout the semester.

Geier, Heidi Rachel Brammer-Shlay, and William Daddario. "Embodied Learning: Motivating Students through Movement and Imagination." 2006 Collaboration Conference. Bloomington, MN. 17-18 November 2006.

Abstract: Our question is organized around the principle that students need to embody their learning through physical action and the construction of discipline-specific fiction. Both directed motion and faux-historical writing force students to re-imagine themselves in new cultural dimensions. For us, then, motivation is bound up in the action of constructive imagining. This session will appeal to anyone interested in making active learning physical.

Gini, Maria, John Chilton, Murray Jensen. *Creating Cooperative Competition: Learning Games for the Classroom..* Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Abstract: We are investigating how students can cooperate in small groups to work on joint projects or learn essential knowledge and then assess their own progress through competitions. This session will involve participants in actual games as well as a discussion of the games' efficacy in a cooperative learning setting. How do we take advantage of the constructive tension between competition and cooperation?

Gini, Maria, and John Chilton. "Learning Games: Creating Cooperative Competition." 2006 Collaboration Conference. Bloomington, MN. 17-18 November 2006.

ABSTRACT: How do you make cooperation competitive? Competition provides students with motivation and focus, while cooperation has been shown to improve student learning outcomes. How to combine the two? In this session, we explore a classroom framework in which students cooperate within groups and compete between groups, an approach that has the potential to

maximize the benefits of each kind of structure. In one example, we examine how to help students practice learning otherwise dull material in the framework of a common quizzing game. In another instance, we investigate how contests invigorate group assignments and prod students who tend not to work well in groups to enjoy working collaboratively. At the bedrock of these activities is a practice that is highly adaptable to many disciplines and one which calls upon the best of cooperative learning and the motivational energy of academic competition.

Huchendorf, Steven C. *Measuring Achievement and Attitude in Large Lecture Classes: Lessons Learned from the Bush Grant*. Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Abstract: How do we improve educational outcomes? How do we improve our teaching? An experimental section and a control section were compared to determine the efficacy of a difference in pedagogy. One section of Business Statistics utilized collaborative learning in Active Learning Techniques – Classroom Assessment Technique (ALT-CAT) groups. The other section utilized the same problem based learning but not in collaborative groups. What is the impact on educational outcomes of student achievement and student attitudes? Instruments measuring each were designed and data collected for analysis.

Jensen, Murray. “The Anatomy Bowl: Student Competition and Cooperation.” Classrooms of the Future. St. Paul, MN. 23 May 2006.

Abstract: My question has been how to balance competition and cooperation in an online gaming environment. At the University of Minnesota, we’ve built a database-driven, Flash-based multiplayer quizzing game to help make Anatomy drill and practice engaging. Students compete against each other and in teams in an “orchestrated review”; assessments are also done cooperatively. The gaming architecture will be open source so different disciplines can extend and adapt it.

Jensen, Murray. “Using the Anatomy Bowl in Your Class.” Human Anatomy and Physiology Society. Austin, TX. 27-31 May 2006.

Abstract: Students in freshman level human anatomy and physiology course use an on-line game to review histology, organ anatomy, and gross anatomy. Student opinion data indicates that the competitive environment created by using the game promotes learning by making it more enjoyable. Individual and group games are staged in a 40-station computer room, but can also be run at remote locations. This presentation will focus on how instructors can use the software with their own students.

Jorn, Linda, David Langley, and Carol Carrier. “Engaging Large Classes at a Research University.” 2006 POD Conference. Portland, OR. 25-29 October 2006.

Abstract: Redesigning large lecture classes to incorporate innovative teaching and technology continues to be a central issue for many universities. In this session, we provide preliminary data from an ongoing three-year study funded by the Archibald Bush Foundation in which 12 course teams examine ways to creatively assist students to become reflective and responsible learners. A collaborative team consisting of a faculty member, graduate students, and an undergraduate has worked to sharpen research questions for each course and to adjust course delivery and assessment procedures. The overall goal is to mainstream successful approaches for additional university courses.

Kirkby, Kent, Fred Finley, Amy Chen, and Paul Morin. "Overcoming Students' Misconceptions in Earth Science Education." 2006 American Geophysical Union. 11-15 December 2006.

Abstract: The University of Minnesota's Introductory Geology Program recently began to develop and use geologic concept surveys. Designed to measure changes in student knowledge and confidence through the semester, these surveys clearly demonstrate the remarkable tenacity of students' prior knowledge and misconceptions in surviving or resisting course instruction, unless instruction is specifically designed to counteract those misconceptions. They use this previous understanding to interpret, revise and often dismiss new information presented in class. The present study demonstrates that classroom 'interventions', targeted to specific misconceptions can overcome this barrier. Once students believe that their previous understanding is incorrect or incomplete and inadequately explains phenomena, they are more likely to understand, accept and use a new interpretation in subsequent explanations. The present study presents a suite of common earth science misconceptions and demonstrates the effectiveness of targeted 'interventions' in overcoming them, compared to traditional instruction methods. The results clearly demonstrate the importance of instructors knowing what knowledge or concepts students bring to their courses, as well as the remarkable effort still needed to identify and document students' perceptions of how the Earth works.

Kirkby, Kent, and Fred Finley. "Using Geological Concept Surveys to Gauge the Relative Effectiveness of Course Components and Instructional Methods in Geoscience Classes." Geological Society of America. 22-25 October, 2006.

Abstract: Recently the University of Minnesota's Introductory Geology Program began to develop geologic concept surveys to gauge changes in pre-instruction and post-instruction student knowledge. Each survey consists of roughly 20 questions on various geologic concepts, but for each question students are also asked to indicate their confidence in their answer. So changes in both student accuracy and confidence levels can be tracked through the course of the semester. Survey questions were chosen to cover three content subsets, topics only covered in lecture, topics only covered in lab and topics that were covered in both lecture and lab. Results from the study were striking. As expected, labs proved to be far more effective than lecture, but the degree to which traditional lectures failed to alter students' concepts was dismaying. On most lecture-only topics, significant changes in student knowledge only occurred when lecture activities were designed to specifically address and challenge students' prior understanding of the topic. For the most part these 'interventions' were capable of raising the lecture component's effectiveness to rival the lab component's, but few instructors are aware of the necessity for these interventions.

Kirkby, Kent. "Developing and using visualizations in Earth Science classrooms." Classrooms of the Future. St. Paul, MN. 23 May 2006.

Abstract: Every discipline has some conscious or subconscious 'gate-keeper' skills that determine students' success in that field. In Earth Science, those skills primarily revolve about the ability to conceptualize things in three dimensions. The introductory geology program at the University of Minnesota has invested a lot of time and energy in coming up with ways to level the playing field for students who do not yet have developed strong spatial skills. Although developed for earth science applications, these same technologies have application in any discipline in which spatial relationships play a critical role, from architecture and engineering to math and medicine. These

technologies range from ones that require access to relatively high-end equipment to others that are so affordable and flexible they have been successfully adapted by elementary classrooms.

Robinson, Julia, Valerie Ruhe, and Marc Beitz. (in press). "The Scholarship of Teaching and Learning: Negotiating Multiple Perspectives on Course Redesign to Promote Student Engagement." Presentation. Annual Meeting of the Scholarship of Teaching and Learning Conference. London, UK. 17 May 2006.

Abstract: The goal of Architecture 3711 at the University of Minnesota is to provide a critical understanding of the environmental design professions, especially architecture, from the perspective of socio-cultural issues. Although most design practitioners see themselves as socially oriented, the values of the architectural profession often conflict with other social values. This course exposes students to the dilemmas faced by designers due to these value conflicts. This paper illustrates how multiple perspectives on the course (instructor, teaching assistants, consultants and students) permitted redesign to promote student learning. The paper is framed by diagrams of the instructional views at beginning and mid points, and addresses the conceptual changes from multiple perspectives. It concludes with a model of how survey data, qualitative notes of team meetings, theory of teaching and learning and personal reflection will continue to effect ongoing change during the remainder of this grant project funded by the Archibald Bush Foundation.

Ruhe Valerie, Julia Robinson, Sue Wick, and Paul Baepler. "Designing Research: The Scholarship of Teaching and Learning in Large Lectures." London SoTL 6th Annual International Conference. London, England. 18-19 May 2006.

Abstract At the University of Minnesota (USA), faculty from a broad range of disciplines have engaged in a campus-wide initiative to redesign large lecture courses under a grant from the Archibald Bush Foundation. These faculty members, leading 12 course redesign teams, have addressed the barriers to student learning in large classes by adopting a variety of interventions intended to enhance reflective and responsible learning and student engagement in large lecture classes. To evaluate these interventions, the ITTS grant consultants adopted design-based research (DBR), an emerging paradigm for educational inquiry (The Design-Based Research Collective, 2003). This new research paradigm uses mixed methods to determine the success of theory-based innovations in educational settings. In this paper, we will focus on two large lecture courses at the University of Minnesota—Biology 1001 (Introductory Biology I: Evolutionary and Ecological Perspectives) and Architecture 3401.

Ruhe, V., Zuiker, V & Gudmunson, C. Using Design-based Research to Evaluate a Cooperative Learning Intervention: Lessons Learned, Center for Educational Development, Evaluation and Research (CEDER) Conference, Texas A & M University, Corpus Christie, TX, December 1, 2007.

Abstract: First, we will describe Design-based Research (DBR), and its resemblance to action research and extended-term mixed methods. DBR has been applied to K-12 and educational technology interventions, but seldom to large lecture courses. We will then give an overview of our team-based project to redesign a FSOS 3101 (Personal and Family Finance) course, an Innovative Teaching and Technologies Strategies project at the University of Minnesota funded under the Archibald Bush Foundation. Over three semesters, our team implemented a series of

small group case discussions based on authentic scenarios in financial planning. For evaluation, we used a mixed methods approach, and blended survey data on student response with interview data and committee meeting notes. Our findings consist of a theoretical model and evidence of aptitude-treatment effects. We will conclude that DBR is an effective model to guide evaluation studies of cooperative learning interventions.

Shackelford, Jole, Valerie Ruhe. *Using Writing to Foster Critical Thinking in the Large Lecture Course*. Enhancing Student Learning: Conversations About Research and Practice. Minneapolis. 23 April, 2007.

Abstract: Roundtable discussion will focus on various ways to use writing as a teaching tool in the large undergraduate lecture class and the problems and challenges that arise in implementing writing assignments. Topics include making assignments that support the teaching goals, providing quality feedback on student writing assignments, the use of technology to facilitate the writing process, and discouraging plagiarism. Participants will be asked to share their ideas and experiences on teaching writing across the disciplines.

Walker, J. D., Brad Cohen, and Paul Baepler. "Engaging Large Lectures: Inter-Disciplinary Collaboration and Technology." 2006 Campus Technology Conference. Boston. 31 July – 3 August 2006.

Abstract: As part of a three-year effort, the University of Minnesota and the Archibald Bush Foundation created teams from 12 disciplines to improve student engagement in large-format courses using smart applications of technology. Each team consists of an undergraduate, graduate student, instructor, evaluator, and instructional consultant; and each discipline-specific team collaborates with each other on a monthly basis. See video of students engaged with dancing robot dogs, cooperative gaming, evolution-contests: these and other results of this unique project.

Zuiker, Virginia. S., Valerie Ruhe, Brad Cohen, Megan Lundberg, Clinton Gudmunson, and J. Egge. "Using Case Studies in Large Enrollment Courses: A Comparison of Two Methods." Association for Financial Counseling and Planning Education (AFCPE) Annual Conference Proceedings. San Antonio, TX. 15 – 17 November 2006.

Abstract: Our particular course, Personal and Family Finances, faces challenges common to large courses where students come from a variety of backgrounds, majors, interests, and abilities. Our design task was focused on the implementation of formative case studies. Our research questions ask whether students prefer case studies to be integrated with other forms of teaching or whether they prefer stand-alone case studies and which of the two methods is more effective. All significant differences in the survey data favored integration of the case studies with other material rather than as a stand-alone method.

Zuiker, Virginia. S., Brad Cohen, Valerie Ruhe, Megan Lundberg, Clinton Gudmunson, and J. Egge, "A Collaborate Approach to Redesigning a Large Enrollment Course Using Case Studies." Presentation at the Annual ISSOTL 2006 Conference. Washington D.C. 9-12 November 2006.

Abstract: Large enrollment course redesign is a complex undertaking. In this presentation, we will detail the collaborative effort and iterative design process of a team including the instructor, a graduate student, undergraduate students and consultants from two central support units with expertise in evaluation and instructional design, and we will share results from our evaluation of two approaches to integrating case studies in the course.

Internal Presentations

Cotner, Sehoya. "A slacker's guide to in-class assessment," College of Veterinary Medicine seminar September 2007.

Abstract: Using data from Bush-grant-supported initiatives, I will demonstrate some low-cost, high-yield strategies for student involvement and in-class assessment. Techniques to be addressed include the Immediate Feedback Assessment Technique, Classroom Response Systems, the Magic 8-Ball random number generator, and question massages.

Cotner, Sehoya. "A slacker's guide to in-class assessment," Teaching Enrichment Series August 2007.

Abstract: Using data from Bush-grant-supported initiatives, I will demonstrate some low-cost, high-yield strategies for student involvement and in-class assessment. Techniques to be addressed include the Immediate Feedback Assessment Technique, Classroom Response Systems, the Magic 8-Ball random number generator, and question massages. Workshop participants will practice all of these techniques, and will leave with a list of resources for implementation in their own classrooms.

Cotner, Sehoya. "Notes from the front lines: Active lecturing versus traditional format in introductory Biology," College of Veterinary Medicine seminar March 2007

Abstract: Discussion will center on data from a quasi-experimental test of active lecturing in the large-lecture introductory biology arena. In Fall 2006, two experienced instructors taught two introductory biology courses in two very different formats. Section one was "traditional" format, with 75-minute lectures. Section thirty was "active" format, with significantly reduced (or absent) lecturing, and an emphasis on group activity and the process of science. Evaluation involved student perceptions of the classroom activity as well as performance. Students in the active section outperformed the traditional, yet their perceptions of the course were significantly lower than that of the comparison group.

Cotner, Sehoya. Best Practices Institute plenary (invited talk for the University of Minnesota's Allied Health Sciences Education meeting, May 2007): "What *are* they thinking? A slacker's guide to in-class assessment."

Abstract: The speaker will discuss the pros and cons of the "active lecture" model based upon her own experience and research. She will emphasize and illustrate some simple techniques faculty can use to uncover student questions and misconceptions.

Cotner, Sehoya. "2 Sections, 2 Methods, and 600 Biology Students." Inter-Campus Conversations on Innovative Teaching. 7 November 2006.

Abstract: Discussion will center on data from a quasi-experimental test of active lecturing in the large-lecture introductory biology arena. Following the short presentation, attendees will gain experience with the Immediate Feedback Assessment Technique.

Huchendorf, Steve, Jason Liu, Marco Habermann, Ryan Schaefer and BJ Bronson.
“Twin Cities Bush Grant: Promoting Student Learning in Large Classes: OMS 2550 Business Statistics.” Presentation to Carlson School of Management. October 4, 2006.

Abstract: With support from a 3-year Bush Grant, pedagogic changes were made to OMS 2550 – Business Statistics. The traditional lecture / discussion format was changed to a lecture only format. The additional lecture time utilized collaborative learning in Active Learning Techniques – Classroom Assessment Technique (ALT-CAT) groups. Lessons learned from the Bush Grant include:

- 1) ALT-CATs were found to increase student achievement
 - a) Pretest mean of 10.09 points improved to 17.18 post-test on a 20 point test
- 2) ALT-CATs were found to increase student confidence
 - a) Pretest of 10% responses of ‘I am 99% confident’ up to a post-test of 81% responses of ‘I am 99% confident of my answer’
- 3) Students found ALT-CATs to be useful in learning the material
 - a) 6.21 mean out of a 7 point likert scale survey
- 4) ALT-CATs provided greater incentive for attendance
- 5) ALT-CATs provide a methodical approach for implementing participation points
- 6) Faster feedback to students is possible with ALT-CATs
- 7) ALT-CATs answers the questions – Do the students understand? Can we go on?

Robinson, Julia. Arch 3711-Conceptions & Feedback—Goals. 9 November, 2005.

Abstract: The presentation of Architecture 3711: Environmental Design in the Sociocultural Context by the course team showed instruction goals, team roles, problems to be addressed, and the plan of action for the next 3 years. We wondered if students were learning without the satisfaction of seeing their progress? We saw the problems being (1.) an unfamiliar and complex subject matter, (2.) students unused to questions rather than answers (3) students insecure trying new things (4) expected to do things they do not know how to do. The proposed changes included making the course organization more apparent through reorganization of the lectures, rewriting assignments to clarify their purpose, developing new instruction on how to do some of the required tasks (reading, writing, analyzing), and better linking the lectures to the assignments. Additionally the instructor was concerned to develop an issue-based approach to teaching rather than a content-based approach.

Robinson, Julia. Arch 3711-Conceptions & Feedback—Accomplishments. 8 May, 2006.

Abstract: Based on the assessments that were done the previous year and during the second year of the grant, diagrams were shown indicating the difference between the instructor's conception of the course before the grant and after the grant, and the student conceptions as they evolved over time. The evolution of the instructors' thinking changed from a course where content was communicated to the student, to a course where student learning took place in a variety of ways. A comparison of the instructors' new vision of the course to students' conception showed that while instructors envisioned a unified course with the elements relating well to each other, from the student perspective in the first year of the course only some things related well (such as the readings and the critical paper). In the second year far more connections were seen between course elements. although the relation between the lecture and critical paper and the in-class exercises and critical

papers needed more work. The plan for the final year included improvement of the class exercises and more modeling of writing and analysis in lecture to make better connections between lecture and critical papers, greater use of dilemmas, and developing techniques to make student transformation more evident to the student.

Solvie, Pamela A. "Alt-Cats in Large Lectures." Inter-Campus Conversations on Innovative Teaching. 4 April 2006

Smith, Kevin. "Problem-Based Learning in Agronomy." Inter-Campus Conversations on Innovative Teaching. 1 November 2005.

Abstract: We have implemented a problem-based learning approach in a large lecture biology course intended for non-science majors. Several challenges that we have encountered include: students making connections between lab and lecture, lack of motivation to learn, and attendance. We have proposed a number of interventions to address some of these challenges. We have introduced online pre-lab quizzes to insure that students read lab material prior to attending lab. We are also restructuring the organization of the course to better align with lab activities. We will be using survey tools to monitor student responses to these and other interventions.

Wick, Sue, Fall, Bruce, Cotner, Sehoya. "What Do Students Really Know?" Biology Program Seminar Series: Conversations on Teaching and Learning. 7, September, 2007.

Abstract: We have used Instant Feedback Assessment Technique (IF-AT) scratch-off forms in several biology courses as a way to increase student engagement in class, help students identify their misconceptions, and guide them in exam preparation. The IF-AT is low-tech and easy to use. We will present data on instructor and student perceptions of this approach and show some comparisons with the use of classroom response systems (clickers) to achieve the same goals.

Upton, Kevin. "Handling Large Enrollment Classes Successfully." Presentation to Carlson School of Management. February, 2007.

Internal Publications

Cotner, S. 2007. "Preparing not to lecture: Does active learning really work?" *Transform.* 2(1) 1, 7-8.

Abstract: In Fall 2006, two experienced instructors taught two introductory biology courses in two very different formats. Section one was "traditional" format, with 75-minute lectures. Section thirty was "active" format, with significantly reduced (or absent) lecturing, and an emphasis on group activity and the process of science. Evaluation involved student perceptions of the classroom activity as well as performance. This essay focuses on instructor perceptions of the active classroom.