

Dear Participants,

The scholarship of teaching is one of the treasured values of our university. Faculty members across all disciplines continue to invest in and promote new ways to enhance the learning opportunities for our students. The 2009 Conference on Higher Education Pedagogy proceedings provide a vivid example of the dedication, imagination, passion, and commitment of our faculty to the scholarship of teaching. As members of a research university community we can readily transfer the skills and approaches we use in our disciplinary research to new advances in pedagogy. In today's environment attention is focused on learning outcomes for our students, and the examples provided in these abstracts demonstrate effective ways to strengthen the learning process. The inaugural conference lays the groundwork for ongoing efforts to recognize and share new approaches that have the potential to help all faculty members and all students.

We have embraced learning, discovery, and engagement as the major scholarship domains for our future growth and development, and the accomplishments of our faculty as reflected in these abstracts provide a wonderful demonstration of the integration of these three important areas. I extend a heartfelt thank you to everyone who planned and participated in the conference.

Mark G. McNamee
Senior Vice President and Provost

Dear Participants,

Some educators describe learning as a process of acquiring knowledge through experience and cognitive skills and others consider it a process of gaining knowledge by understanding concepts, and applying the knowledge after analysis and synthesis. No matter how the process of learning is described, different pedagogical approaches are needed at different times to enhance learning. At Virginia Tech, we are committed to supporting faculty in their preparation to facilitate learning, and the Center for Excellence in Undergraduate Teaching (CEUT) is one of the key units on our campus that is leading this effort

The curriculum serves as the bedrock upon which content is organized for delivery to students and pedagogy involves the principles and methods of delivery of the content. An examination of the intersection between curriculum and pedagogy is therefore necessary to ensure that our faculty members share best practices and explore new and cutting edge approaches to teaching and learning. To that end, CEUT organized the first ever campus-wide conference at Virginia Tech. The objectives were to share best practices as well as discuss and explore new frontiers in the scholarship of teaching and learning. With an initial expectation of about 100 attendees, the conference attracted over three hundred participants. This abstract book captures the discussions and ideas that were presented at the conference. It provides a snapshot of the scholarship of teaching and learning and serves as one of the steps in our renewed efforts to improve undergraduate academic experiences. I hope as you peruse through this book, you will consider joining us at next year's conference.

Daniel A. Wubah
Vice President and Dean for Undergraduate Education

Conference Host

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Comments from the Conference

“Seeing teachers in so many different curricula that were finding ways to implement new and non-traditional ideas emphasized the point that I could do it as well.”

“Helped remind me of the wonderful colleagues I have who care a lot about teaching. The amount of participation convinced me that SOTL is alive and well at VT.”

“It is reinvigorating to be around other individuals who care about and pursue innovative teaching approaches.”

“I was challenged to think about aspects of my discipline that are typically not emphasized.”

“I really like the idea of having an entire day of sessions. It was good to have this uninterrupted time to reflect on my teaching challenges while getting input from presenters and colleagues.”

Research in Teaching & Learning

Presentation Sessions

<http://www.ceut.vt.edu/conference.html>

An Autoethnographic Perspective on Feminist Teaching

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Abstract: Feminist teaching involves living the politics of how we theorize educational and social relations among learners. Unlike the hierarchy in patriarchal pedagogy, feminist teaching builds spaces to share authority and power for all participants (Fisher, 2001). Feminist teaching is participatory and relational, providing students opportunities to engage in self-reflexive and communal ways of critiquing and constructing knowledge (Blaisure & Koivunen, 2003). Feminist teaching is radical because it removes the boundary between students' lives and the world "out there." Feminist teaching remaps pedagogical boundaries to help students confront injustice and work toward social change (Boler & Allen, 2002). Yet, feminist teaching is in danger of being eclipsed and erased due to pressures internal and external to feminist theory and practice (Leonard, 2006). Feminist scholarship about the constructed nature of social identities has called into question feminist pedagogies that privilege experience-based knowledge claims as the primary way to teach (Sanchez-Casal & Macdonald, 2002). I propose to address the continued relevance of reflexive teaching practice based upon my own experience to make a case for keeping the feminist in teaching.

The Book Project: New Strategies in Undergraduate Research and Student Engagement

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Abstract: This session will present the history and results of efforts in the Department of History to increase student engagement and the scope of undergraduate research by implementing “The Book Project” in senior seminars. This project seeks to incorporate undergraduates into the actual experience of working historians by having students in senior seminars work collaboratively to create an edited volume on a specific topic during the course of a semester. The results of repeated surveys have led to two significant findings. First, focusing on the stepwise process that leads to an edited volume proves remarkably effective at increasing student confidence in the acquisition of research and presentation skills. Second, the creation of a durable product (a book that is distributed to each of the students and deposited in the library) increases student commitment and engagement. We conclude that “The Book Project” increases both engagement and learning and that the process and results may be widely applicable to other disciplines.

Case Study Teaching as a Means to Improve Students' Critical Thinking

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Abstract: Seeking to improve critical thinking skills of undergraduate natural resources management students, we experimentally examined differences between two approaches to teaching: instructor-focused learning (i.e., traditional lecture format) vs. learner-centered instruction (i.e., case study teaching). In sequential years, we taught four upper-level undergraduate courses offered within the College of Natural Resources, first using traditional lecture methods and then using case study methods. Student performance was evaluated under both formats using the same combination of commercially available standardized tests and a qualitative assessment of student writing. Although measures of critical thinking generally improved under the case study approach, the amount of enhancement observed was tied to the degree to which case studies were incorporated into instruction: greatest improvement occurred where desired instructional content flowed from within well-developed cases rather than where content was presented first, but reinforced using cases merely as examples. Gains were most evident where students led the effort to identify and challenge inherent assumptions, evaluate the type and quality of evidence, and formulate alternative hypotheses and solutions to problems. Despite initial trepidation by some students, many believed they benefited from having experienced case study teaching as a new way of learning and applying knowledge.

Creating a Model for Utilizing an Online Tutorial with Classroom Instruction to Improve Learning and Assessment: An Example from the Virginia Tech Agricultural Technology Program

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Abstract: In the Agricultural Technology Program, we have found that many students are lacking proficiency in grammar skills despite having adequate grades in high school English. Therefore, we not only require a Communications Skills class, but we also strive to find innovative methods of instruction and assessment to improve student performance. We utilized an online grammar tutorial that contained instruction, examples, and skill assessment tests and integrated it with classroom instruction. We gave students a mixture of self-paced learning with instant feedback, classroom instruction, one-on-one instruction, and immediate objective assessment. We found immediate and significant improvement in student comprehension of grammar concepts and ability to apply them. Assessment from the online tutorials involved a pretest, example questions with instant feedback of answers, and a post test that was used as the student's grade for that unit. Following classroom instruction on the topic, students completed the tutorials either on their own or during lab with the instructor. The post test, which was used for their grade, was proctored by the instructor. Additionally, students were assigned and assessed on written homework assignments on the same topic areas. Finally, they were given a midterm which incorporated all the various grammar topics.

Debates as a Learning Tool: What is the Value?

Dixie Watts Reaves

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Abstract: Student retention of course content is enhanced when students are engaged in the learning process and when they see application of theory to issues that are important to them. Debates can promote critical thinking and improve communication and teamwork skills. Can debates be effectively utilized in large lecture classes? Can debates cause changes in attitude? Debates were conducted in a 275-person introductory microeconomics course. Students rated their strength of feeling (strongly agree, somewhat agree, somewhat disagree, strongly disagree) on six controversial topics (the pre-assessment) related to agriculture, food, or natural resources. Following in-class debate, students voted on a winner (the agree side won convincingly, it was close but the agree side won, it was close but the disagree side won, the disagree side won convincingly), and then provided their post-assessment of each topic. A comparison of pre- and post-assessment reveals that nearly half of students changed their strength of feeling, with many changing from agree to disagree or vice versa, depending on the topic. Pre-assessment had little impact on student vote, but student vote was strongly correlated with post-assessment. Results indicate that debates can be an effective learning tool in that students appear to be open-minded and willing to change their minds about controversial topics. For some topics, the ability of the presenters to “win” the debate did impact student strength of feeling. Evaluations indicated that students enjoyed taking control of their learning and being actively engaged with the topics, better understanding how economic theory applied to real-life situations.

Effects of First Semester Mentoring for First Generation College Freshmen

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Abstract: Research on first generation college students (FGS) shows them to be particularly at risk of dropping out during their year of college. FGS are disproportionately disadvantaged racial/ethnic minorities (e.g. Blacks, Latinos/as, and Native Americans) and low income rural Non-Hispanic Whites. What these groups have in common beside parents who have not benefited from higher education, is lower incomes and attendance at K-12 schools that do not provide an equivalent level of preparation for higher education that is afforded by middle class suburban school. As a result FGS are at much higher risk of not completing a four-year degree program and they are much less likely to excel and go on to graduate school. The exiting literature suggests that being mentored by faculty during their first semester can be highly effective. Such mentoring has been shown to facilitate more rapid and thorough social and academic integration of the student into the university with the result that mentored students are more likely to complete their first year and go on to graduate. One draw back to the extant literature is that conclusions reached on the effectiveness of mentoring are based solely on cross sectional measures of association. The research to be reported here employed an experimental design with random assignment to control and treatment groups and multiple assessment measures (grades, mentor forms, and an end of year student survey). The study is a pilot mentoring program for first generation college students in the 2007 freshmen class for the college of Science and Life Sciences at Virginia Tech. The analysis, which is on going, indicates that, for disadvantaged minority (Black and Hispanic) freshmen, mentoring literally makes the difference whether or not on average they pass pre-requisite courses in biology, chemistry and math. It demonstrates that the amount and quality of mentoring makes a difference in student's level of academic integration, and that mentored students have a higher opinion of their experiences and quality of education during their first year at Virginia Tech.

Evaluation of Teaching at VT: An Empirical Analysis with Recommendations

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Abstract: A 20-month investigation of the teaching evaluation process at Virginia Tech was concluded in January 2009. Conducted by a University committee, the study utilized two methodological strategies to determine how the current system is working and to propose remedies that may be needed. First it was important to anchor the study in the exceptionally rich research base that informs this topic. Most of the technical questions surrounding this topic have been extensively investigated, and this wealth of information needed to be brought to the task. Secondly, it was necessary to tap into the experiences and concerns of faculty members and administrators who live with the system, and this had not been done for more than 30 years, if ever. Using both a survey and focus group methodology, the study documented a range of concerns that inform this needs assessment. Findings from the literature review and the empirical data collected on campus point to several critical needs that if not addressed will likely damage even further faculty morale and the possibility of advancing the teaching/learning mission. Specific recommendations are offered to clarify evaluation purposes and to overhaul both the student and peer driven components of the appraisal system.

The Impact of Communications Skills Development on College Students' Communication Apprehension

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Abstract: Employers consistently cite effective oral communication skills among the top criteria for success of new hires, but often find candidates unprepared in these skills. Recent research indicates that poor oral communication skills and communication apprehension (CA) are linked to lower academic performance and higher college dropout rates. Enhancing students' employability is vital to the knowledge driven economy of the US (Hawkrige, 2005). The purpose of this study was to determine if student participation in a skills-based public speaking class will decrease their CA and thereby increase their opportunities for employability and career success. Undergraduates at Virginia Tech and three other land grant institutions participated in a required class, "Communicating Agriculture and Life Sciences in Speaking," designed to reduce students' CA while improving public speaking skills. CA levels were measured using the Personal Report of Communication Apprehension (PRCA-24). The PRCA-24 was administered to students (n=294) pre and post course work. Over the semester, statistically significant declines were observed. The primary intervention attributed to the change was skills training. These findings support continuation of the communications course and incorporating CA reduction strategies into all college classes. The result is likely to be a more confident and better prepared graduate entering the workforce.

The Impact of Undergraduate Coursework on Academic Performance of the First Semester Veterinary Physiology and Outcome Assessment of Student Effective Learning

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Abstract: The impact of formal undergraduate physiology/biology courses on the first semester physiology course performance of freshman veterinary students in the Virginia-Maryland Regional College of Veterinary Medicine was evaluated over a period of three years. A second objective of this study was to develop a measuring tool to assess the student exit outcomes in effective learning and teaching effectiveness. A survey of structured 25 true/false questions was administered pre and post of the course, which covers general area of physiology in both cardiovascular and respiratory systems. Comparisons were made between students who had taken formal undergraduate (UG) or advance/graduate courses (ADV) in physiology/biology and who had not (NU). The results showed that knowledge of physiology was gained significantly in all groups (knowledge gain > 20%). The academic performance of the course was significantly lower in NU group as compared to two other groups. No significant difference was noted between UD and ADV groups. The data further indicated that student performed poorly in the class (the course final grades were below B-, low-performing, LP group,) also showed significant lower scores in pre and post surveys irrespective of their previous undergraduate work in physiology/biology. Furthermore, the LP students were continually doing poorly in sequent year pharmacology course. It is concluded that formal undergraduate physiology/biology knowledge preparation had greater impact on the academic performance of the first semester veterinary physiology; perhaps quality and intensity of preparations might have greater impact on the academic performance of the course. Moreover, using pre and post-course progression model can be effectively used as a tool to assess student learning outcomes and effectiveness of teaching. This model can further be adopted as measuring predictor of student academic program progression. Further research should be planned to explore these associations to the student transition between different phases of medical education.

Improving Problem-Solving Self-Efficacy: Learning from Errors and Feedback

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Abstract: Anxiety and low self-efficacy perceptions have been shown to affect students' problem solving ability. This research studied the impact of feedback on the changes in efficacy, anxiety, and problem solving scores for 150 students whose background is far removed from the field of statistics. Students were assigned to one of two groups (feedback, no feedback) in an on-line learning environment. Students in the feedback group showed a statistically significant gain in their problem scores over the no feedback group; however, the mean efficacy scores were lower for both groups after the problem solving experiment. Both groups showed similar averages with respect to anxiety scores in regard to problem solving. The incongruence in problem scores with efficacy scores was attributed to students' over rating of their abilities prior to actually performing the tasks. The process of calibration was identified as an explanation for the statistically significant correlation between problem solving scores and post-efficacy scores for the feedback group. This research aimed to further an understanding of learning and instructional design issues in a technology-driven environment for adult students in the context of quantitative courses such as statistics. Implications for retention of students pursuing graduate degrees or professional careers are discussed.

Levels of Teacher Efficacy in College Applied Music Performance Teachers

Kelly Parkes *Teaching and Learning* (kparkes@vt.edu)

Abstract: The purpose of this research is to establish levels of teacher efficacy in an under-represented population of faculty in higher education. Applied music faculty teach lessons in what is called ‘the applied music studio’ which developed from the European conservatory system of music instruction. The construct of teacher efficacy is a more specialized type of self efficacy where beliefs are held about ability to perform in a particular context but it has not previously been examined in applied studio teachers. This setting is different to the wider higher education tradition of lecture-based or laboratory-style teaching. The current study (in progress) randomly sampled over 1500 college applied music professors in an effort to answer the following research question: What levels of teacher efficacy do college applied teachers hold? Preliminary results (n= 253) show that a national sample hold only average levels of teacher efficacy. It is anticipated that factor analysis will illustrate important beliefs this population have about teaching. Implications for practice may encompass professional development for applied music faculty in the area of teaching and pedagogy, in addition to recommendations for future research to be directed in this area.

A Qualitative Study of Undergraduate Experiences Involving the Ethics of Using Technology in Higher Education

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Abstract: The use of technology has had a profound impact on learning styles and teaching practices in higher education. Instructional technologies are being used to improve learning experiences, teaching practices, and communication strategies. Unfortunately, technological tools available to both teachers and students can be used in ways that provide a myriad of ethical dilemmas. Using a qualitative design centered on interviews, the experiences that students had with the use of technology in higher education were explored. Six undergraduate participants currently enrolled in a large research university volunteered for the study. The results centered around common themes among the participants' experiences that focused on the ways to use technology, the misuse of technology, the social acceptance of poor ethical standards, and the students' perceptions of how to solve the dilemmas. Results indicate that more attention to ethical issues in instructional content could be helpful to students as they make decisions and form their responses to misuse of technology.

Teaching & Learning in Practice

Presentation Sessions

<http://www.ceut.vt.edu/conference.html>

The Art of Teaching: Using Acting Techniques in the Teaching/Learning Process

Gregory Justice *Theatre Arts* (gjustice@vt.edu)

Abstract: This workshop looks at techniques used by professional actors that can be used to enhance teaching effectiveness and communication. Theatre professionals have subtle, yet, highly skilled techniques they use to keep audience attention on them for extended periods of time. Many of these techniques can easily be adapted to classroom teaching. This participatory workshop will explore the connections between live performance and classroom instruction. Workshop participants will explore the similarities and difference between live theatre and teaching. A discussion will ensue on American's number one fear -- public speaking. We will examine why it is American's number one fear, how do actors, and how can teachers, avoid this outcome? Next, we will cover nerves and learn techniques that actors use to avoid stage fright. Participants will learn to warm-up their body before teaching to condition and tone this part of their teaching instrument. Next, participants will learn several theatre techniques that focus on physical dynamics to improve non-verbal communication in the classroom. These are helpful in keeping audience attention on the teacher for longer periods of time.

Best Practices in Education Program Development: Lessons Learned from the National Science Foundation Research Centers Programs

Elizabeth Tranter *Office of the VP for Research* (etranter@vt.edu)

Abstract: In recent years, interdisciplinary research centers have played an increasingly prominent role in the educational experience of university undergraduates both within the U.S. and abroad. The Division of Engineering Education and Centers (EEC), within the National Science Foundation (NSF) Directorate for Engineering “encourages the integration of engineering research and education to accelerate technological and educational innovation and improve the quality and diversity of engineering graduates entering the technical workforce.” [1] Through cooperative program development with funding recipients, programs within the EEC division have documented numerous best practices to achieve better integration of education and research programs. In this session, we will examine several best practices and lessons learned from education program development within research centers, including strategic planning processes, course development strategies, research experiences for undergraduates, recruitment and diversity program development, industry involvement, and inter-institutional collaboration. An overview of new NSF Engineering Research Center (ERC) program objectives for education program development will also be conducted, leading to a discussion of emerging trends related to international collaborations, as well as inculcating innovation and entrepreneurship in the research center environment. The session will conclude with an overview of sample criteria for evaluation of education program outcomes within research centers. [1] “Engineering Education and Centers (EEC),” [Online document] December 17, 2008, 2008 Dec 17] Available at: <http://www.nsf.gov/eng/eec/about.jsp>

Defining Disciplines and Transgressing Boundaries

Joan Monahan Watson
Jennifer Henderson

Interdisciplinary Studies
Interdisciplinary Studies

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Abstract: According to Newell and Green (1982) interdisciplinary studies is defined as “inquiries which critically draw upon two or more disciplines and which lead to an integration of disciplinary insights.” This definition requires a comprehensive understanding of the complexities surrounding the concept of a “discipline,” as well as recognition of complex phenomena that ultimately lead to interdisciplinary inquiry. An Introduction to Interdisciplinary Studies centers around a discussion of knowledge: what it is, where it comes from, who has it, its role in the creation of “truth,” its relationship to power structures. This examination explores principles and paradigms that form the foundation for assumptions students make about the world around them. Using these issues, students complete “Project Utopia,” a semester-long, problem-based activity in which they explore disciplinary boundaries, interdisciplinary inquiry development, and integrated problem solving. The presentation will focus on the pedagogical processes involved in creating this project. The presenters will discuss the project as an example of a scalable assignment that promotes active and engaged learning; present student learning outcomes and opportunities for using the project in departmental assessment; share recent student work; and candidly disclose the challenges of the project and the course curriculum itself.

A Dialog about Research and Funding Opportunities in STEM Education at NSF

Sally Wood *National Science Foundation* (slwood@nsf.gov)

Abstract: This workshop will summarize current funding opportunities from several directorates for NSF support of STEM education research and STEM curriculum development. This is also an opportunity for the participants to discuss their visions for improved STEM education and the external support needed to achieve their goals. Issues can include student learning, curriculum structure, STEM retention and recruitment, and social context.

Making a Large Classroom Learner-Centered Through the Adaptation of Existing Case Studies

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Abstract: Moving away from a traditional instructor-centered learning environment and towards a student-centered, active-learning classroom can stimulate students to function at the highest levels of learning. The use of case studies, which are problem-based stories that have an underlying educational goal, is one way of creating an active-learning environment in a large classroom. Despite extensive research on the value of using case studies, many instructors are unclear about how to make the change in a large class setting which typically takes place in a lecture-hall classroom. In this practice session, we will 1) briefly describe our justifications for constructing a learner-centered classroom, regardless of the class size, 2) engage attendees in a brief case-study example that exemplifies how specific content-driven learning objectives can be accomplished in a large classroom using adapted case studies that are freely available to instructors, and 3) respond to questions from attendees about the “how to” aspects of utilizing case studies in a large classroom, from delivery through assessment. While our example focuses on case-studies, the presenters do have experience using multiple techniques to achieve active-learning environments in classes ranging from 20-150 students and will be available to answer questions about non-case study methodologies.

Moving Beyond Plain Old Access: Preparing International Students for Academic Excellence

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Abstract: For this presentation, we report a novel approach involving academic readiness, English preparation and acculturation used to prepare 5 Haitian students for academic success at Virginia Tech. The students were awarded 2-year full scholarships to complete Computer Science degrees at the university through a 3-year grant from Higher Education for Development (HED) funded by USAID. Recognizing that it was insufficient to merely provide access to the university, the project team decided to take a holistic preparatory approach to help the students attain the requisite skills for academic success at Virginia Tech. We discuss via the presentation the specific steps taken to facilitate the process of overcoming divides, barriers and challenges that could impede the students’ academic progress. We also present lessons learned through this international academic transfer project.

Pulling from a New Bag of Tricks: Ideas for Creating Engaging Writing Assignments

Matt Hettche *Marketing* (hettche@vt.edu)

Abstract: Web-based assignments present opportunities and challenges for university educators. While email, discussion boards, chat, and interactive web sites offer flexibility and additional ways for students to engage course content, questions are sometimes raised about the effectiveness of online learning activities. A familiar worry is that although there are clear gains in student participation, there is often a loss of quality in what students are required to contribute to the learning environment. The instantaneous nature of online communication, for example, often trades expediency for depth and convenience for clarity. Concerns about plagiarism, data manipulation, and academic dishonesty cast further suspicion on the viability of web-based assignments. In the proposed presentation, I will discuss how carefully devised writing assignments might serve as one line of defense in protecting the integrity of the electronic classroom. The goal of my workshop/practice session will be to investigate the kinds of writing assignments that promote critical thinking skills and student responsibility. Particular emphasis will be placed on brainstorming a variety of approaches that have application across the university curriculum.

Student Teams Collaborate to Design an Assessment Based Electronic Portfolio

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Abstract: This session addresses the Human Nutrition, Foods and Exercise (HNFE) Department’s process for the development of an ePortfolio for undergraduate students in the dietetics option. In 2008, dietetic students transitioned from maintaining a paper copy portfolio to an electronic format. A Student Management Team (SMT), faculty member, and a multimedia associate partnered to develop an e-portfolio system for assessment of student learning, and as a vehicle for students to showcase scholastic achievements. The SMT evaluated the accreditation standards and clustered them into six domains: professionalism/ethics, disciplinary knowledge, multifaceted communication, multidisciplinary teamwork, systematic analysis, and experiential learning. Sakai open source system was used to design an e-Portfolio matrix for documentation of student learning based upon student learning outcomes. Students uploaded course assignments into respective domains, cataloged their experiential learning activities, and practiced reflective thinking about the impact these assignments and experiences had on their learning. The SMT is now customizing several ePortfolio templates. They will also become peer mentors and teach the ePortfolio system to other dietetic students and evaluate the effectiveness of their peer teaching. We will be conducting research on the impact peer teaching of the ePortfolios system has on student learning and the enhancement of critical thinking skills.

The Teaching and Learning of Listening: A Survival Skill for First-Year Students

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Abstract: For first-year college students, competent listening skills set the stage for both academic and social success. In this interactive practice session, presenters will share rationale and strategies for teaching listening to first-years. Presenters will discuss their experiment with the placement of listening instruction at different points in a first-semester course. They will explain their use of SOTL principles and will share their reasoning for a curricular change based on the literature and their collective experience, their implementation of that change, their review of instructor feedback about the experiment, and student comments. Presenters will explain and demonstrate practical and engaging strategies for guiding students in the process of becoming active and skillful listeners. Participants from any discipline may gain a new perspective on the relationship of listening to academic and social achievement; they will also have the opportunity to discuss strategies they might use in their own courses to foster critical listening.

Teaching Engineering Material with a Tablet PC

Charles Bostian *Electrical and Computer Engineering* (bostian@vt.edu)

Abstract: As a long time “blackboard and chalk” teacher, I have had a strong bias against most instructional technology, feeling that it takes away the spontaneity and human interaction that are so important in creating excitement in the classroom. In my teaching fields (circuit analysis and electronic design), the teacher must be doing the thought process that is being taught and actively engaging the students in it, not just reading to them about it from slides. Initially opposed to Virginia Tech’s tablet PC initiative, after I saw how tablets could be used, I volunteered to teach the first tablet-based “gateway section” in my department, a 128 student class in introductory circuit analysis. This paper describes what happened and explains how my classroom technique changed. It presents my techniques for using tablets to teach mathematically difficult material that has high visual content. It discusses my equally positive experience with a subsequent tablet based senior/graduate design course as well as in my current junior level class. The paper makes my case for why tablets with the right software are the best tool for engaging students in the engineering analysis and design thought processes, and for showing them how problem solutions evolve in time.

A Web-Based Concept Mapping Tool and Its Use in Teaching

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Abstract: Concept maps can be an effective learning tool to help students integrate new information into their existing knowledge base. They are also useful for the evaluation of student learning, and to identify invalid or incomplete ideas held by the student. We have developed a web-based concept-mapping program (the Concept Mapping Tool or CMT) that allows for the construction and evaluation of concept maps. Students create individual concept maps on a particular course-related topic using the drawing facility of CMT and then submit their maps for grading. The student maps are graded by a rule-based evaluation system that compares their concept maps against a criterion concept map created by the course instructor. Students are given immediate feedback in terms of a percentage grade, as well as information on how to improve their maps. The students can then use CMT iteratively to improve their score and their understanding of the topic. Session attendees will be given an introduction to the use of concept maps in the classroom and the opportunity to use CMT as both a student and instructor. Participants will also be able to develop concept maps for their own courses and shown how to publish the maps and use CMT.

Writing and Choice

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Abstract: The many reasons NOT to include writing, especially in large classes, are well known, including: grading takes too long; individual help takes too long; no TA is available; keeping track of grades is too difficult; even passing back papers is difficult; and students whine too much. But the reasons to include writing are even stronger: writing requires active learning; writing tests comprehension and use; writing is a transferable skill; writing gives faculty feedback. In this presentation I seek to share my own experience of and reflection on the positive effect of offering students choices about which writing assignments to complete. I will include examples from three classes, one large (100-120) introductory Religion class and two small, upper-level Religion classes, focusing on meeting the challenges and reaping the benefits of choice in writing. I expect many of the participants will have their own experiences and best practices to share with the group.

Poster Sessions

<http://www.ceut.vt.edu/conference.html>

Active Classroom Peer Reviews

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Abstract: In Fall 2008, students in the Department of Apparel, Housing, and Resource Management Apparel Senior Studio, and Advanced Pattern Making and Pattern Grading courses participated in active peer reviews of classmates' project proposals. Sitting roundtable fashion, each assignment was reviewed, and then each student presented their ideas and plan to meet the assignment goals, much as they are likely to do in industry team meetings. As the project proposals were presented, the classmates peers questioned and critiqued in a positive, constructive manner as they sought to make certain what their classmate strategies and potentials were to appropriately meet, and ultimately improve on the proposed project for the assignment. Suggestions were welcomed, innovative ideas for reconfiguring projects, and on occasion, students called for voting if they were in disagreement. Open exchange of ideas, questioning techniques, and positive critiques ultimately resulted in improved and more innovative projects. Students learned to work as a team and worked together to improve each other's work, and in turn, their own work improved.

Active Learning in the Classroom: Using a Team-Based Learning Approach with Students

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Abstract: As learners on our college campuses are becoming more diverse, instructors are challenged with finding new ways of engaging them in the classroom. This becomes especially important when class size is increasing and the amount of time available for personal interaction with each student decreasing. Several teaching methods can be used to increase student participation and learning, including small group activities. In support of these efforts, recent research suggests that the ability to work effectively in a team is a critical skill that employers are seeking in new employees (Robinson, Garton, & Vaughn, 2007). Team-based learning (TBL) is a special type of small group facilitation, which differs from cooperative learning or group activities. The strategy integrates a case study and applied learning approach throughout the entire semester, with student teams remaining intact for all of the small group discussions and assignments. The instructional strategy originated in the 1970's to keep students engaged as class sizes increased. TBL has a history of successful integration in business courses and throughout nursing and medical school programs (Clark, Nguyen, Bray, & Levine, 2008; Nieder, Parmelee, Stolfi, & Hudes, 2004). Individuals interested in TBL should first make sure that the learning goals of the class align with the intended use of team-based learning. Students should understand why team-based learning is being used in the class, and they should be made fully aware of the approach during the first meeting. To implement TBL into a course, you must restructure the format of the class. The instructor should break the course content into units, about six units per semester, each unit spanning about two weeks. It is important to carefully put the teams together, as they stay in place throughout the entire semester. Generally, each team should have five to seven members (Michaelsen, Knight, & Fink, 2004). During the course, the instructor needs to 1) provide application exercises for the teams, which replicate real world situations and 2) ensure that feedback is being given for individuals and teams. When students arrive, they take an individual readiness assurance test. When all team members complete the individual test, they engage in the same test as a team. Students discuss answers within their teams, without the use of their notes or readings. After completion of the readiness assurance tests, the instructor provides instruction in areas where students have questions. The team-based learning strategy has been implemented in two courses. One is an upper level undergraduate course in self-leadership and the second is a graduate level leadership theory class. Each course has fully implemented the three phases of TBL. A mid-semester review found positive results. Some comments include students recognizing that they can play off one another's strengths and that everyone on a team gets to voice their ideas and then come to a consensus as a team to solve a problem. Students have also commented about the cooperation that is encouraged, instead of competition within a team.

Assessing the Effect of Online Homework Assignment and Completion on Exam Performance: A Large Sample Size Experiment

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Abstract: Over the past decade, the availability of online homework systems has made it possible to assign meaningful homework to students in large lecture classes without imposing an undue grading burden on the instructor or TA. While these online homework programs cannot replicate traditional pencil and paper assignments, they can engage the students and require them to think about the topics outside of the lecture hall. As with any new teaching or learning tool, the question of efficacy is an important one. Does the requirement and/or the completion of online homework assignments have a significant effect on a student's exam performance? Using a unique experiment design along with the Aplia online homework system, we look at the problem in a novel way, focusing on the effect of homework completion on individual topics taught during a Principles of Microeconomics course. By allowing students to skip homework assignments pertaining to particular topics, we can assess whether the requirement and completion of these assignments effect exam performance on questions related to those topics. Preliminary results based on one semester of data suggest that the completion of the assigned homework is positively and significantly correlated with higher scores on related midterm questions for seven of the nine topics. Results are weaker for scores on the final exam with completion of the related homework significantly effecting scores for only two of the nine topics. These results suggest that completion of homework assignments may affect exam performance on midterms but that the effect diminishes by the time the final exam is taken.

Assessment, Teach, & Learning: Connecting the Dots

Kathryne Drezek *Office of Academic Assessment* (kmdrezek@vt.edu)

Abstract: In times of budget constraints and increased calls for accountability from the federal government (e.g., the Spellings Commission Report), the State Council of Higher Education for Virginia (SCHEV), and even parents, faculty are asked to demonstrate the impact of their teaching and learning with greater frequency and rigor. The Office of Academic Assessment (OAA) at Virginia Tech conceives of assessment of student learning outcomes as inextricably linked to the teaching and learning process, and seeks to support faculty interested in demonstrating the value-added impact of their work on student learning by helping to:

- Establish clear, measurable expected outcomes of student learning
- Ensure that students have sufficient opportunities to achieve those outcomes
- Systematically gather, analyze, and interpret evidence to determine how well student learning matches our expectations
- Use the resulting information to understand and improve student learning (Suskie, 2004)

This practice-based poster session will provide faculty with a brief overview of the resources and services available through the OAA at Virginia Tech. Specifically, this session aims to:

- Introduce faculty to the collection of institutional datasets (e.g., CIRP, NSSE, senior survey data) housed in the OAA that may serve to supplement their direct assessment of student learning
- Highlight unique programs established by the OAA to empower faculty as assessors of student learning for programmatic review or outside accreditation efforts
- Introduce faculty to newly developed resources like the American Association of Colleges & Universities (AAC&U) VALUE – Valid Assessment of Learning in Undergraduate Education – METARUBRICS project, including access to every metarubric developed for each of AAC&U's 14 Essential Learning Outcomes
- Encourage faculty to pursue grant opportunities from the OAA that would support the development, implementation, and dissemination of scholarship associated with student learning outcomes assessment.

The conversational format of the practice-based poster session will also allow faculty to generate questions related to the assessment of student learning that will, in turn, inform the refinement of OAA's offered resources, services, and outreach efforts to the university community. Suskie, L. (2004). *Assessing student learning: A common sense guide*. San Francisco, CA: Anker Publishing, Inc.

Beyond Bullet Points: Adding Animation, Music and Videos to Your PowerPoint

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Abstract: I propose to conduct an interactive, hands-on workshop that teaches participants to use the more advanced features of PowerPoint to engage their students and heighten their retention of the material being taught. The Millennial students are overwhelmingly oriented toward the visual, and so I tie an image to each point that I make, using the “custom animation” to introduce the image only when I am talking about it. These students unconsciously expect a multimedia experience in the classroom because that is what they experience in every facet of their high-tech lives. Each of my lectures is also scored with background music throughout that is designed to create an emotional setting for the material and better encode in their minds. The integration of video – either archival or documentary – is also an important part of the equation. Short clips (less than five minutes) break up the potential monotony of the class and introduce a “second voice” into the narrative that helps students to compartmentalize and organize the material in their minds. In a very real sense, I attempt to present the students with a live-action documentary that they might watch on the BBC or PBS, one that is simultaneously informative and engrossing. Though powerful, these skills are easy to teach. Though not perfect, PowerPoint has a relatively simple interface that makes application of these theories and techniques possible for every level of user.

Center for Student Engagement and Community Partnerships

Michele James-Deramo *Center for Student Engagement and* (deramo@vt.edu)
Community Partnerships

Abstract: The purpose of this poster is to introduce participants to the Center for Student Engagement & Community Partnerships--its mission and its components as a unit that advances engaged teaching and scholarship. CSECP provides faculty development opportunities in support of service-learning, the scholarship of engagement, engaged departments, and student capacity building. CSECP is also home to VT Engage, the campus-wide initiative to reinvigorate the university motto of Ut Prosim--That I May Serve.

Collective Reflection and Interpretation of Theory through Collaborative Model Construction

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Abstract: Merriam and Caffarella (1999) suggest that planners of adult education programs (including professional development conferences) consider, “who’s interest is being served by the programs offered, who really has access to these programs, who holds the power to make changes, and what are the intended and unintended outcomes of the way in which adult education and learning opportunities are structured” (p. 34). In addition, Hayes (2001) has suggested to educators that programs designed with women, “should emphasize collaboration, support, and affiliation” (p. 37) thus allowing participants the opportunity not only to experience the new information that is presented, but also build peer relationships that support the incorporation of the new knowledge into practice. During the Program Planning in Adult, Extension, and Agricultural Education course students were invited to participate in a collaborative effort to create a model of their interpretation of the three groups of program planning theories: classical, naturalistic, and critical. As the discussion of the group model occurred throughout the semester, the participants’ ideas were collected into a color-coded diagram that illustrated the progression of the changes and additions to the group’s vision of program planning theory. Course Participants were able to focus discussion around their model as they reviewed their prior understandings of the initial theories and reflected on those changes they agreed to make in the model to reflect the initial theories and those that were added as the course progressed. At the conclusion of the course the participants determined that the group discussion of the theory model was critical to their understanding an analysis of the program planning theories introduced through the course curriculum.

Community-Based Educators as Participant Observers in Adult Education: Gauging Engagement

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Abstract: A team of eight educators created a framework for a process evaluation of a three-day professional development opportunity that focused on use of participant observation by community-based educators. Adapting an experiential learning framework from the university-based Extension system, the facilitators planned the process evaluation and reflected on lessons learned after the event. Goals of the exercise included giving the participant observers experience with a new evaluation method and exposing those being observed to a new method of evaluation. The effort was credited by participants for exposing them to evaluative thinking in the work setting. The exercise also created some discomfort, conflict, and learning among the professionals about assumptions and work routines during organization-sponsored professional development events. Evaluation capacity building exercises can align nicely with questions encountered in the scholarship of teaching and learning. In this case, a collaborative approach to teaching and learning one evaluation method plays out amongst a group of community based educators, exposing assumptions and raising questions about the processes of teaching, learning and professional development in an organization.

A Comparison of Writing Strategies and Multiple Choice Assessments

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Abstract: To investigate strategies to influence textbook comprehension, three types of writing assignments were compared with each other and to multiple-choice quizzes on a course-end comprehensive test in two sections of an educational psychology course. One notable feature of this study is that it was a component of actual classes in which grades were assigned to students who were studying the content to meet graduation and certification requirements. Results indicated there were no significant differences between the two sections' scores on the post-test. None of the three writing assignments resulted in higher comprehension although students did appear to improve their abilities to write. The implications of the lack of differences between the two strategies for textbook comprehension and retention are discussed in terms of writing as a learning tool, efficient use of students' and teachers' time, and further research.

Contemplative Education

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Abstract: Learning doesn't happen only in the mind; it is a full body, full spirit, fully experiential activity. My personal teaching philosophy is rooted in contemplative education, which seeks to challenge character, engage students in self-exploration and awareness, and sees the inner transformation process as essential to learning. I view students as successful who wholly wrestle with the meat of the course – ideas, theories, systems – and through this begin the natural process of implementation into the world. Integration of knowledge through contemplation, writing, conflict, and lively discussion leads into effective action. Without this process of students bringing themselves to the material and then applying it to real life situations, I would feel like I had not been an effective facilitator of true learning. This poster presentation will present an overview of contemplative education and how to apply it in a university setting. Contemplative education is based upon learning happening in the present moment and to this end I believe it is my role as a professor to cultivate a space in which students are aware of themselves, their classmates and the subject matter in the now. Three practical ways to increase present-centered awareness in the classroom are through limiting distractions, creating safety, and role-modeling. Limiting distractions for me invites students to bring their full attention to the topic at hand, sitting in a circle, turning off computers, cell phones, and other tools of multi-tasking, and being varied in my teaching methods to captivate attention are ways to meet this goal. Creating safety for me is synonymous with creating community. I believe people learn best in dialogue with others. Dialogue can only be authentic when people feel comfortable expressing their truth. Safety means that respect is encouraged, as is appropriate self-disclosure and disagreements. It means that diversity issues are spoken, not overlooked or minimized, and minority opinions are given equal value. Role-modeling is a simple phrase, but is difficult in action. I hope to model for my students how to be present, passionate, respectful, and inquisitive. I believe that as a leader of a class, the dynamics created will be largely due to who I am, and how I am, as a teacher. If I want students to engage, I must be engaged if I want students to think critically and integrate ideas, I must design lectures, discussions, assignments and evaluations that promote these qualities, and if I want students to bring their whole selves to the classroom, I must be willing to do the same.

Creating Information Literate Students across the Curriculum

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Abstract: Information literacy is defined by the Association of Colleges and Research Libraries (ACRL) as "a set of abilities requiring individuals to 'recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information'" (2008). Additionally, the ACRL website states: Information literacy forms the basis for lifelong learning... An information literate individual is able to:

- Determine the extent of information needed
- Access the needed information effectively and efficiently
- Evaluate information and its sources critically
- Incorporate selected information into one's knowledge base
- Use information effectively to accomplish a specific purpose
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally

The State Council on Higher Education for Virginia (SCHEV) has defined information literacy as one of its core competencies (SCHEV, 2007). The College Librarian Program (University Libraries, 2008) offers subject specialists to teach information literacy (also called bibliographic or library) instruction sessions. Generally these types of classes are requested by a faculty member or teaching assistant to provide a "one-shot" session for students to learn how to use the library's resources and become information literate. However, addressing all six points of the ACRL criteria to create an information literate person in one 50 or 75 minutes class is not feasible. Nor is it possible in that time for students to develop the critical thinking skills they need to become information literate. As evidenced by the annotated bibliography created by Erin Ellis (Ellis and Whatley, 2008), the development of critical thinking skills is crucial to the development of competent information literacy skills. This poster will present several methods for incorporating information instruction into their course content in order to effectively develop the information literacy skills of their students. *Online course guides*-Librarians can create a tailored online course guide to introduce students to quality resources in their subject area and help them identify and determine appropriate resources to use for their research projects. These guides can be offered in conjunction with one-shot session or as a stand-alone guide for students to use on their own. *Assignments*- Librarians can assist instructors in creating effective assignments that will help students understand and differentiate between information sources as well as improve skills to critically evaluate information resources. Assignments can be designed to progressively develop the skill sets throughout the semester so students develop effective information skills to locate and analyze resources based on several criteria. *Embedding a librarian into the course curriculum*-The Earth Sustainability Course, UCSS 2984, is a course that spans four semesters. Students are taught information literacy skills through various projects requiring they use a variety of information resources. Students build upon previous information skill sets so when they finish their fourth semester, they have developed highly competent information literacy skills.

Design Pedagogy and the Sovereignty of Learning

Shelley Martin *Architecture* (sfmartin@vt.edu)

Abstract: Design Pedagogy and the Sovereignty of Learning Shelley F. Martin Abstract The author Walker Percy writes that the essential nature of education should be openness. This, he believes, is the only condition and environment within which true knowledge may develop. A subject must be ready to be discovered, but not prepared to be discovered. Openness of the larger subject under study as well as openness of the particular thing before one requires that its mode of presentation as an academic exercise also firmly resists contrivance and compartmentalization. Percy writes that, to its detriment, the “educational package” typically calls for adherence to a preordained and prefigured learning experience, which not only inhibits, but also prevents true intellectual discovery and inquiry.¹ True discoveries depend upon the condition of autonomy. The freedom of curiosity and the possibility of spontaneity may only appear, be recognized, and subsequently flourish within a construct that allows observations to become individual and particular to the learner. Architectural education is a similar act of discovery whose true nature compels that a problem is to be both detected and found by the student rather than pre-described by the faculty. The environment is predicated on the cultivation of the free sovereignty of an individual pursuit. Architecture taught as a model of educational discovery is more important than architecture taught as an academic course. Work conceived in the setting of architectural education is a discovery-based act of making enabling the learner to seek and establish a specific set of criteria that guides in the development of a formulation. The beginning design studio in particular is based upon an essential pedagogical belief that artistic processes of working reveal ideas made visible through resources and rules both found within the work itself and brought to the work as produced. The interrelationship of the idea of form and the act of making require that it is more important for a work to reveal its own nature rather than revel in received ideas. This process results in the objects of design existing as knowledge where making engages the philosophical immanence of form. In 1969 reporting on developments in a newly established curricula for the College of Architecture at Virginia Tech, Dean Charles Burchard, a student of Walter Gropius, stated that “...we need new curricula that will eschew ‘covering the field’ in favor of emphasizing the deep conceptual grounds of a discipline”.² It is in this educational construct that the plastic nature of design as discovery may occur through a sovereignty natural to the open observations and practices of one who seeks to learn. Burchard’s words echo Percy’s notion of the autonomy of the learner and the openness of the object of study as critical to true education. It is in such environments that education arrives as new knowledge, the true function of a university. 1. See Walker Percy, *Message in a Bottle*, Farrar, Straus, and Giboux, 1975. 2. Charles Burchard, ‘Dialogue and Discovery’, *AIA Journal*, Jan 1969, p 45, 48.

Digital Library Educational Module Development and Field-Testing Results

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Abstract: Digital library (DL) courses have been developed from both Computer Science (CS) and Library and Information Science (LIS) perspectives. In general, CS has put more emphasis on the ‘digital’ aspects of DLs (e.g., software systems, digitization and compression methods), whereas the ‘library’ services side (e.g., identifying information needs, online information seeking behavior, references services) was emphasized by LIS schools. As a result, there was a need for a unified interdisciplinary DL curriculum that could provide more complete learning opportunities for both areas. The DL Curriculum Development Project, which is a joint effort of CS at Virginia Tech and the School of Information and Library Science at the University of North Carolina at Chapel Hill, has been developing DL educational modules for graduate students since January 2006. Out of 47 modules specified in the project’s curriculum framework, 15 have been developed (already more than originally was proposed). VT participated in the field-testing of 13 modules (four of them newly developed at VT). In our presentation, we introduce the project, and elaborate on the module development and field-test results from VT. The comments gathered from four module development teams at VT also are presented.

Earth Sustainability: Establishing a New Path for Learning

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Abstract: At Virginia Tech, we have developed a research-on-teaching-and-learning laboratory in the Earth Sustainability (ES) Program—a two-year long, interdisciplinary, STEM-saturated general education program that instantiates the goals, objectives, and pedagogies advocated by research on learning and student development in the early college years. Through the longitudinal assessment of two cohorts of ES students, we have developed a “learning path” to the critical thinking skills and abilities. Our findings support the claim that this curricular approach accelerates students’ epistemological development, which in turn leads to more efficacious beliefs about the learning process and the learner’s role and to higher degrees of motivation. Our findings also demonstrate that learning beliefs and motivation influence several student performance indicators, such as metacognitive skills and critical thinking. We hypothesize that these factors are necessary antecedents to advancing students’ STEM Learning & Literacy, which includes information literacy, quantitative reasoning, scientific reasoning, and problem-solving. This paper presents the development of the learning path as well as future directions for establishing the basis of our ES-Derived Model of STEM Learning & Literacy.

Effect of an Online Mind-Mapping Program on Student Understanding of Biology

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Abstract: The use of concept or mind maps in teaching at the college level has rarely been studied. This research examined the impact of mind maps on student understanding of introductory biology. A typical class of 100 students was divided into two classes of 50 students each. Prior to class, students received a list of biological terms and were asked to either construct a map and/or read the text before class. Each class period was divided into a mini-lecture of that reviewed the professor's mind map or covered the material using a traditional lecture while the remaining time was devoted to critical thinking exercises. The experimental design was: a) spring 2005, one class constructed a map online and the other constructed a map on paper and the professor's map was used for lecture in both classes; b) fall 2005, one class constructed a map online and the map was used for lecture, the other class did not construct a map and received a traditional lecture; and c) fall 2006, one class constructed a map and one did not and both received a traditional lecture. Each semester both classes took the same exams. Students were allowed to bring a "study guide" to each exam. The exams emphasized application of facts and concepts, much like the critical thinking exercises did during class. For the top and bottom quartiles, grades were not noticeably different between treatments, but differences were noted for the inner 50% of the class. For the two classes taught in 2005, students constructing mind maps online had higher exam scores than those students who did not. For the 2006 traditional lecture classes, there were no differences in exam scores between those who constructed maps and those who did not. Biology majors who constructed mind maps did somewhat better than life sciences students. Women, especially biology majors, who did concept maps had significantly higher test scores than did the men ($P < 0.05$). Constructing mind maps prior to each class had an impact on most students. While some students did not like having to prepare for each class, most found the exercise beneficial. Some common student comments are as follows: • I found the concept maps to be quite helpful, mainly because they are what motivated me to actually read the textbook. • I think the concept maps are a really unique learning tool in that they connect ideas that the textbook doesn't necessarily do a good job of connecting. • I think the teaching style that I could learn best under would be lecturing with concept maps because then I would know what the professor finds important. • I do feel that the concept maps were helpful in increasing my problem solving ability, but I do not think they were as helpful as a tool for retaining information. • Some students reported that this approach changed the way they took notes and how they organized material for essay exams and term papers in other classes

Exploring New Teaching Strategies for Classes with 100+ Students

Janet Rankin *Human Nutrition, Foods and Exercise*

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Abstract: Exploring New Teaching Strategies for Classes with 100+ Students Janet Walberg Rankin, Ph.D., Department of Human Nutrition, Foods, and Exercise, jrankin@vt.edu Statement of the Problem: The course, “HNFE 3864: Concepts of Preventive and Therapeutic Exercise”, is designed to present concepts that are critical for preparing students for careers as well as a certification exam in this field. The student numbers in classes in HNFE have substantially increased over the last 15 years. The instructor is updating her strategies and fit to this class size and the needs of students. As most students in our curriculum will be involved in working with patients or clients, it is important to insure that they can apply the material rather than simply memorizing facts. As the instructor has moved to multiple choice exams for practical reasons, this is more difficult to evaluate. The instructor participated in several CEUT and FDI workshops and sought to bring new strategies to instruction in one of her larger classes. Goals: Primary: Increase active learning and connection of students with instructor in a large class. Secondary: Pilot an assignment designed to extend student learning beyond class material and practice student-initiated learning. Methods: Primary: The primary steps I took to increase active learning during Fall 2008 were: - Developed 14 in-class, small group problems or activities (10-15 minutes each, 3-6 students per group) based on application of material from class; occurred unannounced in classes and worth 15% of grade - Recruited two undergraduate students who took the class the previous year to helping to develop problems and assist working with small groups during class Secondary: The instructor solicited volunteers from class (eligible if “B” in the first test) to pilot an on-line evolving case study (using Discussion Board in Blackboard) that required each student to answer one posted question and comment on at least one answer of another student. Many of the questions were beyond the class material so required that they sought answers through other sources. Each of five weeks the instructor posted clinical data and one question for each student related to the case study. Outcomes: Primary: The average for the in-class group problems was 10.5 out of possible 12 points (allowed two drops, each worth 1 point) with 58% having 100% attendance for unannounced in-class activities. Secondary: All five students fully participated each week. The instructor monitored the answers and communicated with the students electronically. Four of the five students responded to nine feedback questions sent using the survey.vt.edu tool. Highlights of results included: 100% rated the questions as “moderately difficult”, 100% used the internet as a primary source for information, 75% described the amount of new information they learned as either “a good bit” or “a lot”, and 75% answered that they that the information they learned during the on-line case study would stick with them “more than” what we covered in class. Conclusions: The in-class activities and use of undergraduate assistants resulted in high attendance and insured application of material. The on-line case study enhanced student-directed learning.

Foundations of Epistemology: How Do Humans Know?

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Abstract: This paper is aimed at helping university educators be more effective on two fronts. First, we shall revisit longstanding principles in philosophic thought and imagery about the human knowing process. Then we will explore some strategies for recognizing and utilizing students' various learning styles in our classrooms, including distance learning. A key element in effective teaching is for the instructor to know one's own learning style(s). Though land-grant faculty have generated a lot of creative ideas about strategies for teaching today's students, the search for new anthropagogical ideas needs to include reflection on basic principles of epistemology.

The Global Seminar: Improving Interactions and Building Learning Communities Globally and Locally

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Abstract: The Global Seminar is an interactive teaching network connecting students worldwide in a global learning community sustained by internet-based technologies. The Seminar explores global issues of environment and health with emphasis on sustainability. Intrinsic to the exploration of topics with worldwide relevance is the need for an effective method of educating students in global differences in culture, social systems, public policy and economic perspectives, technological advances, and ethical/philosophical systems. During its 10-year existence, the Global Seminar has developed an effective model for providing the infrastructure, pedagogy and human network necessary to facilitate these global learning experiences and build effective, international learning communities. The Global Seminar model combines a cutting-edge, accessible technology suite with innovative, constructivist pedagogy to improve the quality and frequency of student-to-student, faculty-to-student, and faculty-to-faculty interactions. The Global Seminar model improves the quality of interactions within global learning communities by providing students with direct access to their peers worldwide. The new educational paradigm created through the Global Seminar provides students a direct experience with other cultures. The affordability and accessibility of the internet-based technology suite ensures that every global partner in the learning community will have access to the same high-quality program resources. Face-to-Face video conferences create a visible virtual environment in which students can discuss and debate with their classmates across the world in real-time. The program's virtual library of 25 case studies and supporting multimedia material ensures that students share a common point of reference for discussion; real-time chat capacity guarantees that even when time differences make video conferencing difficult, students have access to their international peers around the clock. The Global Seminar has a versatile application for collaborative, interactive and enhanced education in any context. Conference participants will have the opportunity to learn about the theoretical and conceptual grounding of the Global Seminar and its practical application at the Virginia College of Osteopathic Medicine (VCOM). VCOM implements the Global Seminar in collaboration with medical schools in Latin America to advance public policy and medical practice. Critical issues on health and environmental sustainability transcend national boundaries. During the course of the seminar, medical students examine, discuss, and formulate positions on health and environment-related case studies and their applications in the participating countries. Each case study is analyzed from a seven dimensional matrix: a) Social/Cultural; b) Political; c) Economic; d) Technical; e) Health; f) Environmental; and g) Ethics/Philosophical. Mechanics of the course include student participation through on-line chat, computer access to course materials from a virtual library at Cornell University and live interactive video conferences. Medical School participants include Edward Via Virginia College of Osteopathic Medicine and national and private schools in the Dominican Republic, El Salvador and Honduras.

Greenroof Practicum for VT and Canadian Students

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Abstract: Green roof design and installation is one of the fastest growing areas of sustainable eco-friendly landscaping, particularly in the greater Washington DC area as the US government uses more green roof designs on federal buildings. The Department of Horticulture offered a Green Roof Practicum course the week of August 18, 2008. Students planted a green roof on a portion of Seitz Hall roof to help beautify the Agricultural Quad area of campus, reduce building temperatures, filter pollution, and reduce storm runoff. This one week, hands-on course taught students how to design and install a green roof. The project was offered with the help of Riverbend Nursery near Riner, VA and Beegle Landscaping of Floyd. As part of the class, students visited Riverbend Nursery and hand-planted containers that were used for Riverbend's containerized green roof system. The class was comprised of 20 VT undergraduate students and 5 students from Nova Scotia Agricultural College in Truro, NS. Participation by the Canadian Students was funded by a grant to Virginia Tech and Nova Scotia Ag. College from the US and Canadian Departments of Education.

The Hahn Horticulture Garden at Virginia Tech: Celebrating 25 Years of Engaging Students

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Abstract: College and university affiliated botanical gardens can serve significant roles in both undergraduate and graduate education (Lewis and Affolter, 1999). The “living laboratory” nature of a university-based garden lends itself to hands-on learning in a student-centered environment. Only through university-based gardens could opportunities to engage horticulture students in such meaningful learning experiences occur (Hamilton, 1999), providing them with the competitive edge for entering the landscape contracting field. The Hahn Horticulture Garden was started in 1984 as one landscaped acre designed by Horticulture faculty and students. The garden has since grown to nearly six acres and serves both the education and outreach mission of the department, college, and university. Ten HORT courses regularly utilize the garden, as do a host of related disciplines such as Entomology, Plant Pathology, Landscape Architecture, and the Agricultural Technology program. The garden is also a principle means of forming learning communities among horticulture students. Gabelnick et al. (1990) define a learning community as “any one of a variety of curricular structures that link together several existing courses...so that students have opportunities for deeper understanding and integration of the material they are learning, and more interaction with one another and their teachers as fellow participants in the learning enterprise.” Our horticulture curriculum is interconnected and this interrelationship plays out in a most visible fashion at the garden, e.g. site preparation, planting, and maintenance knowledge gained in Landscape Established is put to use in the hands-on Public Gardens Maintenance and Management course. Literature cited Gabelnick, F., MacGregor, J., Matthews, R.S. & Smith, B.L. (1990). Learning communities : creating connections among students, faculty, and disciplines. San Francisco: Jossey-Bass. Hamilton, S.L. 1999. The Roles of the University of Tennessee Gardens in a Public Horticulture Teaching Program. HortTechnology 9:539-695 Lewis, A.J. and J.M. Affolter 1999. The State Botanical Garden of Georgia: A Living Laboratory for Student Education. HortTechnology 9:539-695

How Does a Spanish Class End Up in the Horticulture Department?

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Abstract: Immigration into the United States is historical and modern. The faces and the languages change but people seeking work in our country is a continuous occurrence. The last immigration influx brought many Spanish speaking people into our labor workforce. This new Latino workforce was the catalyst in creating a Spanish class in the Horticulture Department at Virginia Tech. The Landscaping and Agricultural Industries were among the first to encounter language and cultural barriers on the job site. By request from these industries the Horticulture Department added Spanish to its curriculum. Developing a class that brings two subjects together has its obstacles. Teaching an interdisciplinary class is a challenge. A class that incorporates language, culture and immigration has specific hurdles of its own. These challenges were met to create a class that is now a model for other universities around the U.S. I would like to share the story of Spanish for the Green Industry and the methods I use in a multi-subject classroom in hopes to encourage others to develop the class they have been dreaming to teach.

How Farmers Prefer to Learn: Lessons for Non-Formal Education

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Abstract: This project examines how farmers prefer to learn and what that means for nonformal educators in their work with educational program development and delivery. Non-formal educators use a variety of methods for teaching content and processes that enhance student learning and adoption of new practices. This research project specifically looked at farmer learning preferences and Extension educator's instructional methods. We found a farmer/student's desire to succeed and be innovative can be met in part, through effective educator professional development that results in educational programs, both content and processes aligned with farmer/student's preferred methods of learning.

Identifying and Promoting Transformative Learning in Non-Formal Education Environments

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Abstract: Nonformal educators have long known the transformative potential of intensive programs such 4-H camping programs that result in positive human development. This study explored how the camp experience transforms the lives of young adults. Thirty-three seasonal camp staff (18-28 years old) with at least five years experience at one of Virginia’s six 4-H educational centers during the summer of 2007 participated in a focus group to examine transformative learning in the camp environment. In addition, 21 camp staff completed an online survey describing how camp has changed them and the characteristics at camp that promote that change. Our results show that 4-H camp deeply changes young adults and specific conditions in the learning environment promote this change.

Implementing Effective Strategies for Assessing Student Learning Using Mobile Technology

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Abstract: Abstract In this study we determine the feasibility of assessing students' perceptions of their learning using mobile devices including cellular phones, smart-phones and iPod Touch devices. Our hypothesis is that the handheld devices will provide students flexibility in their access to the survey from a variety of locations. These might range from completing the surveys in class, waiting for the bus, meeting colleagues, studying in the library, or other locations away from PC's or laptops. It is expected that these networked portable and affordable devices will flexibly increase the time and places for students to participate in teaching and learning assessment activities; therefore, increasing time spent and response rates on assessments. The research was conducted at Virginia Tech with a sample comprised of 109 graduate and undergraduate students during Summer Session 2008. Participants voluntarily completed an online survey using mobile devices either in classrooms or in the student center and completed another paper survey to provide feedback on their satisfaction with using the mobile devices for assessment. Although technical challenges remain in the use of phones in the education environment, eighty percent or more of participants were satisfied with using cell and smart-phones and iPod Touch devices for assessments.

Incoming Freshman's Socio-Economic Status and its Influence on Personal Epistemology

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Abstract: Little research has been attempted in exploring the influence of background characteristics of student's personal epistemology. Belief-based theories, developed by Schommer (1990), view personal epistemology as composed of a set of independent beliefs and have been an important theory that guides the field of personal epistemology. Belief-based measures have, however, been plagued by psychometric problems as well as a debate as to the definition of the construct of personal epistemology, with some advocating learning beliefs as a separate construct than epistemic beliefs. The purpose of this paper is to report on the impact of student socio-economic status, sex, and high school achievement on entering college students' personal epistemology and learning beliefs. We use an alternative method of scale construction for the beliefs-based outcome measures to overcome these psychometric problems. Additionally we use OLS regression to examine the importance of student socio-economic status, sex, and high school achievement, and knowledge beliefs. Findings suggest demographic and academic background factors influence entering college student epistemology and learning beliefs. Moreover, findings support a distinction between 'knowing and knowing' and 'knowing about learning'.

Increasing Assessment Effectiveness in a Time of Decreasing Budgets

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Abstract: Shrinking educational budgets call for reductions in academic agendas, and put additional stress on faculty members whose responsibilities do not shrink. Simultaneously, enrollments are rising along with demands for higher quality education. While seemingly paradoxical, this is a prime opportunity for improvements in engineering education through assessment. Assessment is essential for continuous improvement of teaching and learning, which becomes especially difficult to do when department budgets are tight. As such, for colleges and universities dedicated to delivering high-quality education there becomes a demand for highly efficient, or lean, assessment methods. This paper discusses the development of lean assessment methods and protocols to advance the quality of instruction, all while maintaining accreditation demands, during resource-stressed times. This work will also discuss implementation-evaluation results, faculty and student buy-in, and future opportunities. Faculty members at a large, research-intensive university were interviewed in 2007 to evaluate assessment needs for an engineering education department. Needs covered a variety of academic levels, contexts, and teaching and learning issues, but many cited one common constraint to realization: time. Now, in the spring of 2009, academic budgets are not poised to hire any additional faculty to assist, yet the assessment demands remain. As such, the only way to provide increasingly effective educational opportunities for students is to find innovative ways to implement classroom and program assessments. First, following assessment procedures, the program educational objectives (PEOs), program learning outcomes, and course outcomes are reviewed and used to build a framework. Second, assessment methods are identified which would be ideal to attain the course outcomes. Third, the faculty interview data is reviewed to find commonalities in faculty needs, and then summarized to a concise list. By addressing what needs faculty identified, as opposed to giving department mandates, some buy-in is gained here. Fourth, these faculty-identified needs are investigated for matches with the ideal assessment methods, effectively blending the ideal with the desired, and creating practical assessments (PAs). Fifth, a meeting with each faculty member is held to inject parts of the PAs into assignments that are currently being used in the course. At this point, the efficiency of the assessment methods becomes critical. Using the current course assignments, opportunities are pinpointed that allow for minimal modification of the assignment while incorporating the PAs. This way, the faculty member does not have to make major changes to the course and its assignments, but can get useful assessment data to help improve teaching and learning and ensure course outcomes are being achieved. Once these small modifications are made to bring in additional assessment opportunities, faculty are primed to make additional, incremental changes in future semesters, eventually developing full data-gathering and feedback mechanisms in their courses. This approach is not only more efficient in itself, it is less intrusive and intimidating to faculty, which are major barriers to initiating an assessment culture in a department.

Information Literacy Skills Instruction: An Assessment

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Abstract: Both library research organizations and accreditation agencies are placing increasing value on developing students' ability to locate, filter and use research ethically. Information literacy competency necessitates students to master a range of techniques. The Association of College and Research Libraries (2006) specifically defines five standards. Standard 1 requires students to "Determine their Information Requirements," including (a) determining the scope of the project, and (b) identifying appropriate information sources. Standard 2 involves "Locating Information," for example, (a) using available tools to find, manage, and record information, and (b) appropriately using technology to accomplish this – these sources may include both catalogued sources (e.g., in the library) and popular sources that may be found on the free Web. Standard 3 is defined as a "Critical Evaluation and Retention of Information Sources," which includes (a) knowledge of information types (e.g., academic research, popular periodicals, and informally published sources), (b) distinguishing the qualities of various types of information, based on source, (c) noting why this distinction is meaningful to research projects (i.e., each medium has advantages and disadvantages), and (d) assessing information. Standard 4 requires "Effective Information Use in Research," including (a) integrating new information into existing knowledge, and the ability to (b) communicating research to others. Standard 5 emphasizes "Ethical Researching," which is demonstrated through (a) academic honesty and avoiding plagiarism. This requires developing a respect for others' intellectual property and attributing their work. Simply teaching these information literacy techniques to students may be insufficient in our current educational climate – both parents and administrators often demand evaluations of our students' learning. Measuring students' competence requires assessment. This poster describes a pilot information literacy skills assessment project undertaken in Virginia Tech in Political Science and International Studies courses. A team, comprised of teaching and library faculty and undergraduate student researchers, developed a quantitative and qualitative instrument. We obtained IRB approval for the study, and recruited students from four classes. These classes included introductory Political Science Research Methods classes and an International Studies Senior Seminar. Students in the sample represent all years and a wide range of prior research experiences, but they were all taught research writing during the term they were sampled. Students' ability to apply information literacy skills has been linked to a range of instructional experiences, including: (1) librarian-led classroom instruction, (2) hands-on experience writing research papers, (3) personal confidence in research skills, and more. This study explores each of these factors, seeking quantitative associations with higher levels of information literacy competency. Specifically, the findings reinforce the value of teaching information literacy skills in the context of research paper writing, and incorporating librarians' skills into teaching these techniques.

Integration of Field Experiences with Classroom Work

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Abstract: My teaching program strongly emphasizes the integration of field experiences with classroom work. In this highly competitive society, it has become increasingly evident that knowledge by itself is not enough without the skill for “doing”. Activities such as field trips incorporate knowledge with “doing”. For example, in courses on revegetation of disturbed sites, students can not develop understanding and appreciation for the subject matter unless they become part of that environment. The specific objectives of the project are: to identify the plant species and species mixtures that are best suited for mine-land reclamation; and to develop a field exercise that will enable students to gain hands-on skills for assessing surface mined reclamation efforts. The project which is located at the Powell River Project Site (Wise County, VA) is a cooperative program of Virginia Tech which focuses on effective and cost-efficient mining restoration practices that protect the environment and the coal industry. In 1990, 16 treatments consisting of a variety of monocultures and species mixtures were established on the reclaimed site. Individual plots measured 3.9 m x 3.9 m and were separated by 0.9-m wide alleys planted with tall fescue. The experiment has been evaluated every year by students from Plant Materials for Environmental Restoration class (CSES/ENSC 3644). Each year the class is divided into 3-8 groups depending on the total number of students. Each group is assigned to one or two treatments (replicated 4 times). The groups evaluate the grass, legume, or the mix stand treatment for biomass yield, botanical composition and ground cover. The group collect samples by cutting all plant material contained in a randomly placed 1 square meter quadrat (1 per plot) to a height of 5 cm above the soil surface. Prior to cutting, each area within the quadrat was visually evaluated using the DAFOR scale (Brodie, 1985). Samples are separated in the field into target species, non-target grasses, and forbs (non-legume broad leaf weeds). Each sample is dried at 65 °C and weighed to estimate dry matter production. For a routine soil analysis, 4 to 6 soil cores are collected from each treatment plot. Statistical analyses were performed on plant biomass, and soil using Analysis of Variance (ANOVA) and Least Significant Differences (LSD, 0.05 level of probability) to separate means with SAS (SAS Institute, 1990). The individual student will summarize the data, the summary include introduction (literature review), materials and methods, result and discussion, and conclusion sections. The field trip is sponsored by the Powell River Project Education Center and Penn Virginia. The fund obtained for the program covers transpiration (2-3 vans), food, overnight accommodations at the site, and supplies for the project. The positive learning outcomes of this field exercise include: collaborative skills, increased interaction in classroom between students after the field trip and most of all total understanding and appreciation for the subject matter.

Intellectual Development Theory in English H1204

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Abstract: As universities become increasingly corporatized and as knowledge becomes more and more commercialized, it is important that first year composition programs resist the movement to farm out its expertise and talent to publishing houses or external organizations seeking to dictate the work of the university and its composition programs. At risk of becoming “diploma markets” for an outcomes based curriculum driven by external forces, universities in general and composition programs in particular must, as James Slevin in *Writing English* points out, “find better ways to put the intellectual work of faculty and students at the center of our educational concerns.” In April 2000, the Council of Writing Program Administrators adopted the WPA Outcomes Statement for First-Year Composition. According to their statement, these outcomes describe “the common knowledge, skills, and attitudes sought by first-year composition programs in American postsecondary education.” Recognizing that “learning to write is a complex process,” the Writing Program Administrators Outcomes became the centerpiece of composition programs across the United States and at Virginia Tech. The WPA’s outcomes focus on a number of areas, including rhetorical knowledge, critical thinking, reading, and writing, processes, and knowledge of conventions. Two outcomes in particular are important to intellectual development theorists. In the “Critical Thinking, Reading, and Writing” section, emphasis is placed on the “use of writing and reading for inquiry, learning, thinking, and communicating” as well as the ability to “understand the relationships among language, knowledge, and power.” These two outcomes reflect the complex nature of learning and intellectual development and require developmental and sophisticated learning strategies that move beyond mastery and form. Marcia Baxter Magolda and Patricia King, noted for their theory of “self-authorship,” emphasize that a university education should lead students through a series of developmental steps that lead them from absolute knowing, to transitional knowing, to independent knowing, and finally to contextual knowing. For Magolda and King, the ultimate goal is the self-authored individual, an individual who is capable of synthesizing the cognitive, interpersonal, and intrapersonal dimensions of learning. King and Karen Kitchener extend the theory by focusing on the ability to grapple with and seek resolution for ill-structured problems. For these theorists, the journey is central. Towards that end, I have revised the English H1204 course to meet the requirements of the WPA outcomes. Applying the intellectual development theories of Marcia Baxter Magolda and Patricia King, I have selected a sequence of literary texts that provoke contemplation and discussion on the “relationships among language, knowledge, and power.” Those readings and discussions are reinforced through a series of classroom strategies and assignments, developmental in nature, that lead students to acknowledge, understand, and apply “the use of writing and reading for inquiry, learning, thinking, and communicating.” My poster illustrates how the goals of the Virginia Tech Composition Program and the Writing Program Administrators Outcomes for First Year Composition can be achieved through the use of intellectual development theory. By being attentive to the process of learning through a sequence of readings, discussions, and assignments, instructors can encourage students on their journey towards understanding the contextual nature of knowledge.

Interactive Learning Experience in Music: Sym-Pho-Ku

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Abstract: The main objective of this interactive computer game is to acquaint students with a specific musical repertoire. This is achieved by a Su-do-ku type game that uses musical excerpts instead of numbers. The game is structured to encourage active listening (focusing on the aural experience rather than using music as background). On top of this, the Sym-Pho-Ku offers an advanced stage, directed to music majors, that requires consultation with music scores. The structure of the game is flexible and allows a wide diversity of musical examples. The aim of my presentation is to show (and play) the game and discuss possible educational ramifications and developments.

An Inter-Institutional Approach to Graduate Distance Learning

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Abstract: Diminishing numbers of faculty in increasingly specialized scientific disciplines have reduced opportunities for coursework tailored to the needs of future scholars in the field. To redress this challenge, the “why to”, drives the need for inter-institutional collaboration to develop and implement a sustainable program. The methodology, the “how to,” is a blended pedagogical approach based on a systematic process of instructional design within a distance education delivery environment. The goal of this session is for participants to define strategies by which collaborative, inter-institutional curricula can be designed and implemented. Specific objectives are to (1) describe how needs assessment data can be collected and used to underpin efforts to seek resources for program development, (2) define how instructional design can serve as a unifying framework for course development, and (3) discuss the advantages and challenges of engaging a multi-disciplinary team for cooperative curriculum design. This presentation will conclude with a panel discussion including the perspectives of subject matter expert, instructional designer, and student participant.

The Living In the KnowlEdge Society (LIKES) Community Building Project: Building Collaboration between Computing and Non-Computing Disciplines

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Abstract: The widespread use of information and communications technologies (ICT) over the past decades has created a trend that ICT is perceived as part of daily life. 31% of Americans are elite tech users, who have information gadgets and services and are fluent in internet usage such as Web 2.0 activities. A knowledge society is emerging, with skillful use, sharing, and management of information in all disciplines. New areas such as bioinformatics and computational economics are embracing ICT. Despite this, the discipline of computing itself is facing tremendous challenges such as declining student enrollment and a lack of diversity. In 2000, the Association for Computing Machinery (ACM) and Association for Information Systems (AIS) published the “Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems”. While its focus was on filling industry requirements for more IT workers, broader needs for producing college graduates who possess the knowledge and skills to work in a knowledge society must be addressed. In 2001, ACM and the IEEE Computing Society (IEEE-CS) published “Computing Curricula 2001”, which assigned only 10 out of 280 core hours in the Information Management related content, which is essential for the Knowledge Society. The Living In the KnowlEdge Society (LIKES) Community Building Project, led by four sites (Virginia Tech, Villanova University, North Carolina A&T, and Santa Clara University) and funded by the National Science Foundation, aims to revitalize undergraduate computing education. The vision of LIKES is to build a community that will define the way to make systematic changes in how computing concepts are taught and applied in both computing and non-computing disciplines. Our goals are to transform computing education so college graduates could help build the knowledge society, and to promote collaboration between computing and all other disciplines to guide the emergence of the knowledge society. We focus on spreading computational thinking skills, ICT paradigms, and key computing concepts, across the society. We ran three workshops (SCU, Dec. 2007; NC A&T, Apr. 2008; VT, Nov. 2008) and plan to have another at Villanova University in March 2009. From three workshops, challenges and lessons were identified through participant discussion sessions (details will be presented in the poster). Participants came from diverse areas in academia: • SCU – Architecture, Art/Art history, Biology, Chemistry/Biochemistry, English, Marketing, Modern languages and literature, Music, Biological and Agricultural engineering and Plant sciences • NC A&T – Biology, Geography (GIS), Music, Physics, Statistics, University studies • VT – History, Mathematics, Engineering, Chemistry, Economics, Psychology, Political Science • Villanova – Archeology, Environmental Science, Ethics, Global Studies, Political Science, Sociology New courses were created too. They are: • VT: Introduction to LIKES, LIKES Capstone • SCU: Information Technology, Business and Society • NC A&T: Introduction of Web Science • Villanova: The Laptop Instrument (CS + Music) Online communities were formed to facilitate collaboration, communication, and sharing of ideas about LIKES: • LinkedIn.com, Facebook.com, Second Life Group, and Virginia Tech’s site scholar.vt.edu. The three LIKES workshops with keynote speeches and discussion sessions helped disseminate our effort to other institutions and to advance academia toward the knowledge society. We plan to continue our effort through the Villanova workshop, a Faculty Development Institute, and identification of LIKES-designated courses at VT.

Meeting Students Where They Are: Impacts of Changing Student Demographics on the Undergraduate Curriculum in Animal and Poultry Sciences

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Abstract: Less than 2% of the U. S. population is directly engaged in production agriculture, and each farmer in the U. S produces enough to feed 125 people. In 1980, about 3.7 million people were farm workers in the U. S.; in 2000, less than 3 million people worked on farms that were fewer in number and larger in acreage than any time in the past. Productivity of those farms and workers continues to rise, thanks in large part to research, teaching, and extension programs at the nation's land grant universities, including Virginia Tech. In general, enrollment in colleges of agriculture have reflected national trends in population shifts, with a decline in total numbers of undergraduates in traditional programs of study. Colleges and departments that can offer current, relevant curricula, however, have maintained or even increased undergraduate enrollment. The Department of Animal and Poultry Sciences (APSC) in the College of Agriculture and Life Sciences at Virginia Tech is one of those. In 1975, approximately 50 B. S. Animal Science degrees were awarded. The number of degrees awarded peaked at 105 in 1980 but undergraduate enrollment is approaching 500 again. Demographics also have changed. In 1975, less than 50% were women; in 2007, 11% of incoming freshmen were men. Only 10 to 15% of current APSC majors grew up on a farm, 90% of them want to be veterinarians when they enroll as freshmen, and they are most interested in working with companion animals and horses, rather than traditional farm animals. The department and the curriculum have changed as well. The first female faculty member was hired in 1986; there currently are eight on staff. The undergraduate program has long been a combination of science and management, applied biology and the economics of raising animals, but the specific blend has changed over the past 25 years. An equine emphasis was added to the curriculum in 1994, and a course on companion animals was developed about the same time. Students are no longer required to take a course on meats, although one is still offered, and the number of undergraduate research projects has increased. In the most recent curriculum revision, completed in 2007, three animal management laboratories were added to ensure that students learn how to work safely around horses, livestock and poultry since so many of them did not grow up around large animals. They also have fewer required senior courses with labs, but must complete a capstone experience to graduate. In the freshman introductory course, students from suburban high schools are very well prepared to handle the science of animals, but often struggle with farm-level applications of those principles. The reverse is true for students from more rural areas; they often know quite a bit about the daily care of livestock, but may struggle with scientific principles. By the time they graduate, whatever their backgrounds, 95% of APSC majors have secured a job, or are enrolled in professional or graduate programs.

Mentoring Science Inquiry Among Children and Older Adults

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Abstract: This study is based on a socio-cultural, inquiry perspective on teaching and learning in the zone of proximal development (ZPD). The purpose of the study is to mentor teachers, college students, and adult caregivers (henceforth they will be called “teachers”) to support learning among young children and older adults engaging in science experiences. The focus is on learning in an activity setting – science experiences. The scaffolding process enables a novice to carry out a task beyond his/her unassisted efforts (for example, Vygotsky, 1984, Hill, Stremmel, & Fu, 2005 , Morelli & Rogoff, 1980). The researchers mentor teachers to learn about teaching from an inquiry perspective. In turn, they will scaffold young children and older adults to learn science processing skills while engaging in planned activities.

An increasing number of aging adults are enrolled in day care. Many of them are in shared-care sites for both children and adults. Thus, there is an increasing interest and need in exploring how best to engage older adults and children in meaningful activities that will benefit them in multiple ways. This trend of developing intergenerational care sites presents a need for those who teach children and those who take care of older adults to take a pedagogical stance in planning and implementing activities that are real, relevant and meaningful to both parties. That is, to go beyond simply engaging in an activity to asking questions such as: What are the learning and enriching potential of these activities? How can these activities be constructed so that children can learn concept of science and the adults can share their experiences?

The Virginia Tech Child Development Center for Learning Research (CDCLR) and the Adult Day Services (ADS) provide an ideal venue for exploring how scaffolding can enhance the development of teaching as inquiry among the teachers who implement shared-activities among older adults and children. In short, how do the researchers mentor teachers to become inquiring practitioners. The sample of this study is the teachers, children and older adults at the respective centers.

The process of mentoring is documented. Implementation of activities is videotaped for coding and analysis. Teacher plans and reflections are collected for analysis.

We shared with the conferees during this poster session the following: (1) Mentoring teachers and caregivers to acquire knowledge of teaching as inquiry in the ZPD; (2) Mentoring teachers and caregivers to learn science processing skills; (3) Planning and implementing science activities that are real, relevant and meaningful for children and adults – taking into account how to scaffold learning of science processing skills among young children and older adult; and (4) Collecting data for mixed-method analysis.

Preliminary findings indicate positive effects of mentoring teachers and caregivers from diverse backgrounds, education, and skills. Mentoring process, activity plans and reflections of implementation were shared with the conferees.

Modeling Deliberative Democracy: Citizens and Experts

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Abstract: Public affairs practitioners are increasingly being asked to engage citizens in deliberative practices. This paper reports on engaging graduate students in three community projects in which they dealt with concerns that had “real-world” consequences: ten forums in a local community visioning, including meetings in industry, town hall, and churches; fifteen in all size communities across the state on transportation’s future; and about ten forums of Virginia leaders in education, business, and government around the subject of human capital, culminating in the First Futures Forum sponsored by the Office of the Governor in Richmond. These experiences revealed a model of deliberative democracy that focuses on ameliorating the tension between citizens and experts that frequently emerges in real-world issues. This model inspired students to pose new issues for research.

The National Science Digital Library Resources to Enhance Learning: Lessons from CITIDEL and the Ensemble Pathways Project

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Abstract: The National Science Digital Library (www.nsdll.org) contains educational resources on key STEM disciplines. Since 2001 Virginia Tech has been part of groups involved in having computing included among NSDL's Science, Technology, Engineering, and Mathematics areas. First, Virginia Tech ran the Computing and Information Technology Interactive Digital Educational Library (www.citidel.org) project, assembling over 500,000 items related to computing. Then, Villanova (with PI Lillian Cassel) took over the resulting production service, and now is leading a larger NSDL pathways project: That is, Ensemble received \$2.5M NSF funding late in 2008, and involves six universities and many related partners, including the K-12 oriented Computer Science Teachers Association. Virginia Tech will be running Ensemble's distributed portal. Virginia Tech Computer Science Department faculty involved include Ed Fox, Steve Edwards, and Cliff Shaffer. Virginia Tech based content feeding into Ensemble comes from a Wikipedia-like service focused on mathematics and computing (www.planetmath.org), a wiki about computing algorithms and their visualization (<http://algoviz.cs.vt.edu/AlgovizWiki/>), and an advanced automatic grading system for computing code (<http://people.cs.vt.edu/~edwards/Web-CAT/Web-CAT-2.html>). Locally developed technologies that will be applied, derived from work with CITIDEL and other projects, include a standardized approach to logging use that provides greater detail than is available from web servers, a methodology to index entries according to multiple category systems even though an author only has employed a single category system, software to collect content from a variety of remote sites that allow metadata harvesting, and programs supporting searching, browsing, and recommending. The fall 2008 course CS6604, Digital Libraries, included student work on a detailed design for the Ensemble portal. We will include new services from Web 2.0 and from the NSDL coordinating team. We will cover all areas related to computing, helping audiences/members to find, create, share, and disseminate computing education materials more efficiently and broadly. In this poster, we will cover the student work from CS6604, and explain the Ensemble project and the emerging portal. We will describe existing and planned collections and services, and show how digital libraries of educational resources can help universities to deal with budget reductions, through sharing and adapting the best materials developed around the nation.

National Seed Science & Technology Distance Education Program

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Abstract: The online course Vegetable Seed Production (Hort 4784) at VT covers diverse topics such as: production, handling, identification, conditioning, enhancement, packaging, storage, testing, federal standards, and seed biotechnology. The course was created to educate students about food security issues and also to serve as part of the cooperatively developed National Seed Science & Technology, Distance Education Program developed and coordinated by Colorado State University. One objective of this program is to provide a national certificate program to educate seed science professionals to meet the growing needs of the seed industry. Hort 4784 is web-based and taught in modules to degree seeking students as well as nontraditional students from industry through Continuing Education. To date, the course has been successfully completed by Virginia Tech and International students. The project is funded by a USDA Higher Education Challenge Grant.

The National Writing Project at Virginia Tech: The 2009 Summer Institute

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Abstract: For over 25 years, the Summer Institutes hosted by the Southwest Virginia Writing Project at Virginia Tech were a vibrant part of education in the area. Teachers in the communities surrounding the university found in those institutes inspiration to write and to incorporate more writing into their classrooms. However, it has been five years since a Summer Institute has been offered here, leaving teachers in the service area without a strong connection to the university and to each other in terms of professional development in writing and the teaching of writing. This poster session will discuss Virginia Tech's new National Writing Project site and highlight our plans for the 2009 Virginia Tech Summer Institute. The nearly 200 local sites that make up the National Writing Project network are hosted by universities and colleges. Co-directed by faculty from the local university and from K–12 schools, local sites serve all 50 states and work in partnership with area school districts to offer high-quality professional development programs for educators. In addition to developing a leadership cadre of local teachers (called “teacher-consultants”) through invitational summer institutes, NWP sites design and deliver customized in-service programs for local schools, districts, and higher education institutions, and they provide a diverse array of continuing education and research opportunities for teachers at all levels. Recent research confirms that students of NWP teachers significantly outperform students of non-NWP teachers. According to the recently released National Writing Project Research Brief, studies conducted by writing project sites have examined the effects of NWP professional development programs on teacher practices and student writing achievement in schools and districts served by the sites. Researchers found that NWP programs had a positive effect on the writing achievement of students across a range of grade levels, schools, and contexts. These studies showed particularly strong student improvement in the areas of content, structure, and stance, all of which concern the quality of thought and the manner in which it is expressed in writing. Housed in the English department, the new National Writing Project site at Virginia Tech will draw on the expertise and resources of a wide variety of units at the university. This year, we have support from the Graduate School, the School of Education, the Faculty Development Institute, Engineering Education, the Composition Program, the Center for the Study of Rhetoric in Society, the Service Learning Center, and the Center for Student Engagement and Community Outreach. This poster will present our plan for the 2009 Summer Institute and emphasize the pedagogy, projects, and people that will help us make our new NWP site a success.

Personalizing Organic Chemistry for Relevance and Student Interest

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Abstract: Organic Chemistry, required by several majors other than chemistry, is a dreaded course. Whether it was a brother's lowest grade or a mother's least favorite class, the horror stories abound. And they abound with good reason. It's a hard class. But can 500+ students be taught the intricacies of the science in a personal and meaningful way? Relating the material to the students and helping the students relate to the material has guided the structuring of Organic Chemistry 2535 and 2536. In addition to standard lectures, testing, and online homework, students are provided with current examples from the news, demonstrations of the reactions, and assignments that guide them in finding the chemistry in their environment and then allow them to process it in their own unique way. A molecule project mid-semester has students provide a correct organic structure of something that interests them. Many find the compound in their hobbies, i.e. boat finishes and tie-dyes, or their daily medications, i.e. ibuprofen and Singulair. How they express their feelings for the molecule is up to them but limited to one sheet of paper. Some write bulleted facts, others poems, and still others draw beautiful illustrations. It is an exercise that raises their awareness of organic chemistry and its relevance in their lives. An extra credit fair uses the student's creativity and competitiveness to embrace the chemistry. For this open-ended extra credit opportunity, submissions have included reports, posters, movies, live performances (both musical and theatrical), and cooking experiments. The fair, held in the last week of the semester, lets students share their originality and gain new perspectives on the topics as they delve into reviewing for the final exam. The peer-voted winner is announced in the final lecture, and the best projects, both molecule and extra credit, are displayed in the chemistry building. These students are required to take Organic Chemistry because future classes and jobs will build on it. Helping the students realize that they can relate to the material, in this class and others, can better prepare them for their future.

Podcasting Steps in the Development of Competitive Reasons Supportive of Equine Evaluation Competitions

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Abstract: Podcast consumers grew by 5% in 2008 based on research by Arbitron/Edison Media Research. The goal of this technology driven pedagogy was to develop a series of podcasts to address the speaking component in horse judging competitions. Creating short podcasts at every step of the learning process is being recorded with VT students enrolled in APSC 3724. Several of these students will compete nationally and their advanced skills will be highlighted at the end of the series. Podcasts will be made available nationwide for youth to improve their speaking skills in this popular competition.

Principles of Biology Online

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Abstract: Responding to increased interest in online science courses we developed an introductory biology course the design of which emphasizes Bloom's taxonomy. This course design integrates prior experience in teaching online and new technologies that allows for synchronous and interactive help sessions. Emphasizing Bloom's taxonomy, students will sequentially engage these learning components: 1) list of terms that need to be emphasized while reading a chapter plus PDFs of key graphics with notations and html summaries of key points; 2) a mind map that will help students understand the interconnectivity of terms; 3) a MC quiz that will test student understanding of facts and concepts; 4) an applied essay question integrating facts and concepts. There will be several online MC exams that will be taken at a secure Virginia Tech facility. The course materials, including exams, will have deadlines. A student can progress as rapidly as possible, but must meet scheduled deadlines to ensure that they complete the course on time. Instructor will hold synchronous online office hours using Centra, by email and telephone as needed. At first 20 students will be accepted into this class and in subsequent terms the course will accommodate more students.

Program Assessment Using Online Student Surveys and Other Measures for Continuous Improvement: A Longitudinal Case Study

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Abstract: In this paper we describe as a case study the development, implementation, and maintenance of the program assessment process for Electrical and Computer Engineering (ECE) at Virginia Tech. The scope includes: 1) development of major measurable learning objectives (MMLOs) defined for each course that match departmental and institutional learning outcomes as defined for accreditation; 2) implementation of systematic methods including online student surveys to obtain student feedback at the end of each semester; and 3) analysis and use of the data by the ECE assessment committee for continuous improvement in teaching and learning. The ECE assessment committee is comprised of faculty from various areas and committees related to the EE and CPE programs and generally meets about ten times each semester. The process began approximately six years ago. The scope evolved and now includes all ECE courses, whether taught face-to-face, at a distance at Virginia Tech locations, or virtually online. Student surveys are conducted online with both standard questions and questions about perceived achievement of the MMLOs that are unique for the course. The recent Fall 2008 ABET review of the assessment process was very favorable. For this reason this case study focuses on how the processes are implemented and how they enable ongoing continuous improvements in teaching and learning.

Reinventing Undergraduate Research: A Blueprint for Department-based Undergraduate Research Programs.

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Abstract: Virginia Tech’s 2012 Strategic plan recognizes a need for increasing undergraduate research. The USDA Scholars summer research program places undergraduates in Human Nutrition Foods and Exercise (HNFE) research laboratories, requiring weekly attendance to a group meeting, and workshops on grant writing, presentations, and scientific paper writing. The program culminates in a multi-institutional professional symposium. Funding for this program was received in the form of a USDA Higher Education Challenge Grant, with matching money from HNFE, the College of Agriculture and Life Sciences (CALS), the Fralin Life Sciences Institute and the Provost’s Office. Seven USDA Scholars selected from a total of 27 applicants took part in the summer 2008 program. The USDA Scholars program increased participation of HNFE undergraduates in a summer research program by 69% over the prior 2 years. Five of the 7 students have continued working in their assigned research laboratories for the Fall 2008 semester. For the fall 2008, 226 students in one of four HNFE courses were peer mentored by the USDA Scholars. A multi-institutional symposium ‘The USDA Scholars Symposium on Obesity, Nutrition and Health’ was held on August 8, 2008. A total of 55 registered participants from the University of Pennsylvania, Penn State University, the University of Michigan and Davidson College were hosted by the USDA Scholars at Virginia Tech. Undergraduate research was featured as both a symposium talk, given by one of the USDA Scholars and an afternoon poster session with 17 posters presented by undergraduate participants. As a direct result of their involvement in the USDA Scholars Program, two students have been accepted into the University Honors Program, two students are applying for the combined BS/MS program in the HNFE department, and one student has been accepted to The Virginia College of Osteopathic Medicine for early admission (2009) to the physician/scientist degree program. This same student also has an abstract accepted for presentation at the 2009 Southeast American College of Sports Medicine (SECASM) meeting, to be held in Birmingham, AL, Feb. 12-14, 2009. In the semester immediately following the summer program, six out of the seven students are still doing independent research either for credit or pay. For each of the three years of the program we will measure two long-term outcomes: The rate of acceptance to graduate and professional schools compared to GPA-matched HNFE students who did not participate in the program, and the participation in undergraduate student research projects by all HNFE undergraduates (not just the USDA Scholars). The results will be published in a peer-reviewed education journal. The USDA Scholars Program is a unique and innovative program at Virginia Tech that integrates a summer research program with peer mentoring, grantmanship, a specialized summer course and a summer multi-institutional symposium. The background of the coPDs in both education and research, the strong financial support garnered at the department, college and university level, and the partnerships formed between the coPDs and other services and resources at Virginia Tech have guaranteed success of the USDA Scholars Program.

Research Education Using a Community-based, Leadership Approach

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Abstract: One strategy for educating our undergraduates entering the fields of science or engineering is the summer research experience. Through the Macromolecules and Interfaces Institute's Summer Undergraduate Research Program (SURP), as many as 40 students from across the country come to Virginia Tech and conduct research each summer. This program, in its 21st year of NSF funding, is a community-based, interdisciplinary learning experience with an emphasis on building leadership skills. Prior to the SURPs arrival, graduate students who will be mentoring attend a leadership workshop. SURPs begin their summer at a community-building retreat with interactive communications and ethics workshops and they attend a short course in technology relating to their area of research. At the end of the summer, their research is communicated in a technical paper and a formal presentation. To prepare, SURPs attend Communications Seminars throughout the summer. Leadership skills are developed as SURPs mentor Middle School students in our Youth Experiencing Science (YES) program. The YES program teams middle school students with SURPs for four afternoons during the summer. During this time, teams assemble various demonstrations and then present them to the public at Blacksburg's street fair, Steppin' Out. Sponsored by VT research faculty, the demonstrations show cutting edge research being done in the laboratories. The YES program provides the opportunity for undergraduates to gain leadership experience. SURPs plan the workshops, teach the middle school students about the technology, and guide the building and presenting of the demonstration. The youth that participate come from southwestern Virginia, including public, private, and homeschooled children, grades four through eight. This is a great opportunity to catch and maintain their interest in technology by showing them the "WOW" factor in research being done at Virginia Tech. A sense of community increases the SURPs investment in and commitment to their summer experience, allowing them to gain more from every aspect of the program.

The ROXIE Project: Service Learning+Design in a First-Year Engineering Course

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Abstract: The instructors of the first year course for engineering students at Virginia Tech, ENGE 1114: Exploration of Engineering Design, are faced each year with the challenge of providing a meaningful, appropriate, and valuable project experience that supports learning and fosters interest about engineering design. While past projects have been suitable for achieving basic learning outcomes, the “canned” nature of these projects does not adequately provide an opportunity for students to learn about or gain experience with broader topics such as working with a customer, identifying customer requirements, framing an open-ended design problem, and most importantly, identifying their role as an engineer in the world at large. In the spring semester of 2008, the instructors of ENGE 1114 saw service learning as a means of achieving these broader learning objectives while still meeting the course learning outcomes for engineering design. The ROXIE Project (an acronym for “Real Outreach eXperiences In Engineering”) was born from this effort. The Teaching Team of five instructors along with the aid of the campus’s Service Learning Center, Community Leaders, and VT Engage, created 179 teams (composed of 4-6 students each) and paired them with 72 non-profit community organizations from the New River Valley. The student teams acted as “Systems Design Consultants” and were instructed to “serve and improve” the community through engineering design. Specifically, the teams were tasked to (i) perform an act of service for the community organization, (ii) meet with the community organization’s leader to identify a design problem that needed to be solved, and finally, (iii) propose a solution to the identified problem by following the design methods taught in class. In this poster, the authors will describe the rationale, pedagogical choices, and administrative tasks involved in providing a design-related service learning experience for first year students on a large scale. Excerpts from students’ reflection essays are presented as anecdotal evidence that the ROXIE Project assisted students to achieve the course’s content and broader learning objectives.

Showcase on Student Growth: Development of the English Department ePortfolios

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Abstract: This poster session addresses the English Department's development of an ePortfolio project for all majors—a project intended to address the department's need for meaningful assessment data and our parallel desire to provide for all students a reflective and engaged undergraduate education. The project has been guided and developed by a team of undergraduate English majors, and on this poster, they introduce their project.

Sponge Activities: An Approach to Squeezing Knowledge Out of Students and Promoting Daily Studying Habits in an Introductory Statistics Course

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Abstract: Daily studying, especially for first-year college students, has always been a challenge for students taking an introductory course. Particularly in statistics, when students do not study, they are least likely to connect previous and future concepts. This makes an instructor's job of teaching the next lecture much more difficult. This research introduced an instructor's approach to encourage daily studying habits in students. A sponge activity is a group exercise, conducted at the beginning of a lecture, in which a sample of students from the class demonstrates mastery of the concepts covered in the previous lecture. The sample's performance is used as a representation of the entire class performance to determine if an instructor should provide additional supplements such as quizzes, worksheets, or homework assignments. Three waves of data were analyzed. The first wave of data is quantitative involving the attitudes of the students who participated in each sponge activity. The second wave of data is qualitative representing recorded instructor observations during each sponge activity. The final wave of data is also qualitative by reviewing student reactions of these sponge activities. The presentation not only summarizes the findings, but addresses the instructor's views using sponge activities to encourage daily studying

Tablet PCs in General Chemistry

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Abstract: This work addresses the integration of Tablet PCs into the General Chemistry experience for first-year engineering students. The tablets were used for the working and submission of homework (graded) via the textbook publisher's electronic homework system, for note taking and surveys (DYKnow) and in the classroom and at home to access their text (an eBook). The purpose of the work was to more fully engage the student in homework and in the classroom.

Teaching Political Dimensions of Children's Literature

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Abstract: Children's literature is not ordinarily thought of as political. However, since it inevitably reflects what its writers, publishers, and editors consider important for children to encounter, it always has an ideological dimension, which sometimes reflects political and cultural views, often implicitly, but at times explicitly. For example, W. E. B. DuBois' column in his short-lived but influential children's magazine *The Brownies' Book* (1920-21) featured stories and pictures about the 1917 children's march in East St. Louis, Illinois, protesting against racial violence against African Americans across the country that year. Dr. Seuss's *Yertle the Turtle* (first published in *Redbook* in 1951, then in 1958 in picture book form) was cited not only as a commentary against Hitler's dictatorship by its author, but appeared in the *New York Times* in the heat of a mayoral battle in the 1980s when councilwoman Carol Bellamy compared Mayor Koch to the megalomaniac Yertle the Turtle. More subtly, children's books of different eras have reflected the political views (and conflicts) of their times, as Julia Mickenberg has argued about the era of the Cold War in her groundbreaking *Learning from the Left: Children's Literature, the Cold War, and Radical Politics in the United States*. In the era of the House Un-American Activities Committee and the blacklist, authors whose work was considered too dangerous for radio, TV, and adult print media continued to publish in the form of children's books, influencing a generation with radical and progressive ideas in covert form. Recent debates about the colonialist assumptions of Jean de Brunhoff's *Babar* books and Hergé's *TinTin* series demonstrate the explicit ways in which European children's books have been analyzed for their political statements, but serve to illuminate the contrast with American children's books, which tend to be seen as apolitical, despite their long history of political engagement, from the Puritan expurgation of royal references in the *New England Primer* after 1776 to Katherine Paterson's complex fictional explications of American sociology and values in the Vietnam War era and thereafter, in books such as *Bridge to Terabithia* and *Park's Quest*. A recent novel such as Edward Bloor's *Tangerine* advances cultural and environmental consciousness through the unlikely genre of the sports story. How can we become alert interpreters of the political dimensions of children's literature without imposing preformed judgments on writers, illustrators, readers and their time periods? The pedagogy of teaching political analysis of children's literature requires instilling a sense of historical context, developing awareness of social issues and political conflicts, cultivating the ability to interpret the symbolic significance of signs and genres, and encouraging an aesthetic awareness of language and artistic form. The purpose of analyzing political dimensions of children's literature is not to politicize children's books, but to illuminate the role of often unexamined assumptions about our society, ourselves and our values. We want to give students the tools to reflect on historical developments and the uses of children's books to instill critical thinking and to promote participatory citizenship through critical literacy.

Transforming Students from Aesthetic Consumers to Creators in Floral Design

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Abstract: Flowers provide a special medium for instruction in visual art in that flowers are aesthetically pleasing by themselves. The goal in floral design then is to apply art elements and principles in creating an even more aesthetic arrangement of those flowers. Even before the university established a liberal education requirement for all students in “creativity and aesthetic experience,” our Floral Design course incorporated those goals in student development. Many students enroll based on peer comments about the opportunity to play with flowers in the laboratory, with 90% claiming zero arranging skills and creativity. The first laboratory becomes an effective pre-test of the creative process with instruction only in flower handling and creative visualization in order to avoid stifling the process. Students are then advanced through 14 laboratory exercises with progressive and cumulative skills development and coordinated lectures across different design styles and cultures, culminating in a post-test design demonstration. From humble beginnings that pleased the students initially, at the course conclusion 95 per cent of the students on average create designs proudly worthy of public display. Within and outside the laboratory a variety of student-centered techniques are utilized to reinforce development in a modified form of the Disney creative strategy identifying roles of dreamer, realist, and critic. The laboratory journal expresses all three roles, including three levels of design review and critique, plus another assignment requires close observation and critique of multiple arrangements, amateur or professionally created. Exercises to develop mental visualization in three dimensions are also included. Assessment is with open-ended reflections at the course conclusion that reveal student appreciation that (1) floral design involves much more art than previously thought, (2) that more arrangements were around them than they had previously noticed, (3) those arrangements were more than just pretty but deserved closer study and appreciation, (4) arranging requires much more time and thought than just dropping some flowers in a vase, (5) they have the confidence and capability to try more demanding levels of floral design, (6) when professional design assistance is needed, they will be able to communicate their desires and evaluate the design quality of a commercial designer, and (7) they have found a life-long skill for enhancement of the personal environment, for therapy, and for a creative outlet.

Undergraduate-level Inquiry: Benefits and Challenges of Engaging in Classroom-based Research

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Abstract: Recently, calls for reform in undergraduate science education have become more widespread. Science educators, researchers, and policymakers alike advocate for more student-centered teaching in higher education and for broader involvement of both science and non-science majors in the practice of scientific inquiry. This research is part of an ongoing study to examine the impacts on undergraduates of engaging in classroom-based research experiences. Here we focus on students' perceptions of the benefits of participating in inquiry learning and its relevance to real life, future education and career plans. The context for this study is the Partnership for Research and Education in Plants for Undergraduates (PREP-U), which was initiated in 2007 with support from the National Science Foundation. Through PREP-U, students address the unanswered question of how disabling certain genes in the model plant, *Arabidopsis thaliana*, influences the plants' interactions with root and leaf herbivores. With teacher guidance, students design and conduct their own investigations to determine differences in herbivory of wild-type (all functional genes) versus mutant (one disabled gene) plants. Students report their findings to scientists interested in the studied genes. PREP-U was implemented in three undergraduate courses in fall 2008: introductory-biology lab courses at two colleges (total - 55 non-majors) and an upper-level plant biology lecture course at a major research university (22 majors). Students designed and conducted their experiment by choosing a research question, developing an experimental plan, selecting variables to measure, collecting data, interpreting their results, developing conclusions, and considering their results' implications. The research is interpretative. Altogether, data sources included 25 sets of individually or group pre-post interviews with majors and non-majors. Content analysis was conducted to identify emergent categories and major themes. Our preliminary results illustrate the wide range of students' perceptions about the benefits and challenges of participating in PREP-U research, including intellectual, social, and emotional aspects of learning. Students reported that some aspects were both benefits and challenges. For example, students indicated the importance of independent work, but also asked for more guidance and support in designing and conducting the research. Additionally, students indicated the importance of understanding how science is done, but noted their struggling with developing scientific rationales, explaining their results, and/or making meaning from their findings. Reported benefits could represent times at which students' expectations or positive prior experience with or perspectives towards science. Reported challenges could reflect less positive prior attitudes toward or experiences with science or unmet expectations. Our results point out the complexity of teaching by inquiry in undergraduate classrooms. Specifically, our findings highlight the balance that instructors must achieve to support students in engaging successfully in classroom-based research. Students must be prepared to conduct experiments, provided appropriate scientific background, and given feedback throughout their investigations, while being allowed time, space, and freedom to make progress independently. We believe that the extent of instructors' involvement, especially how they gauge student's needs and progress to inform their instructional decisions, influences undergraduate students' perceptions of scientific research.

Use of Extra-Curricular Activities to Enhance Instruction in Landscape Contracting Curriculum

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Abstract: Since 1997, students in the landscape contracting program in the Department of Horticulture at Virginia Tech have had the opportunity to enhance their undergraduate experience by participating in three (3) extra-curricular experiences: 1) extended field trips to visit landscape contracting firms, installed projects from those firms, and public horticultural gardens, 2) student conferences/competitions sponsored by landscape contracting industry members held annually at locations across the country, and 3) study abroad opportunities to visit horticultural enterprises and gardens around the world in fifteen countries on four continents. All of these activities have a strong educational emphasis and occur completely outside of a structured classroom environment. Yet, as shown by comments from graduating senior exit interviews, these events are often considered the most important and memorable from their undergraduate experience. These extra-curricular experiences are self-sufficient financially and do not require departmental, college or university funding. Funding is generated from three sources: 1) student fundraising endeavors, 2) industry support, and 3) from the students themselves. The latter form of funding is important to assure student participation and commitment to the event(s). Undergraduates in the landscape contracting program in the Department of Horticulture have had significant enhancement of their knowledge and experience in landscape contracting through these important extra-curricular activities.

Using Student Competitions to Increase Learning Effectiveness: The Value of a Soil Judging Contest

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Abstract: Student judging contests are an effective tool in teaching a subject matter under a different set of restraints and pressure experienced by students in most classrooms. Field contests employ both studying and memorization of a handbook and the physical skills used in the competition. A series of questions was asked of the coaches of teams that participated in a recent soil judging contest hosted by Virginia Tech. 1. What do you feel is the most educational part of the SJ contest for the coaches? 2) What do you feel is the most educational part of the SJ contest for the students? 3) How do you think a SJ contest compares as a teaching tool to other week-long field trips? 4) How is a SJ contest different as a teaching tool or learning experience compared to other week-long field trips? 5) What parts of the week's events this year were most educational? The answers given to these questions plus some background information about the contest week activities and learning objectives will be presented along with pictures of the event.

Using Web-CAT for Learner-Centered Software Programming and Testing

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Abstract: Learner or student-centered pedagogical strategies in higher education are desirable and considered to be among best practices. Learner-centered pedagogy encourages students to be actively involved in knowledge construction and acquisition as well as learning activities. The Web-based Center for Automated Testing (Web-CAT), a learner-centered pedagogical tool, provides immediate and timely feedback for students to use in self-assessment throughout the development of their computer programs as they submit their software tests and programs. In this research we determine the impact of using the Web-CAT tool on student performance as measured by final scores on assignments within the class. We replicate selected earlier studies by Edwards et al. using different research methods and samples. Students' final scores on assignments are categorized as being Group 0 with scores of A or B and Group 1 with scores of C,D, or F. Using these two groups we determine if there are differences in final assignment grades based on several student behaviors. Among these behaviors are time spent on assignments, number of test submissions, timeliness of test submissions and others. Using an analysis of variance (ANOVA) these student behaviors resulted in final scores that were significantly higher. In summary there is a positive and significant difference between students who begin to test their software early as measured by final scores on individual assignments. There is also a positive and significant difference between students who submit their software more frequently for feedback. There is a significant and negative difference between students with higher non-commented lines of code (NCLOC), e.g. with larger programs. The data is comprised of 3047 observations of students enrolled in VT's CS classes in Spring 2004-Spring 2006 with the exception of Fall 2004.

Week Long Practicum Course to Teach Landscape Contracting Skills

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Abstract: The landscape contracting segment of horticulture is a very fast-growing and lucrative enterprise. This segment deals with the numerous activities and materials that coalesce to create and maintain landscapes (e.g., residential, commercial, parks) and outdoor living spaces (e.g., gazebos, water gardens, walkways). Due to the nature of a landscape contracting curricula, courses are most effective when they combine fundamental information in a traditional classroom format with practical experience garnered in an “on-site” or a lab setting. Thus, there is a need for students to have “hands on” exposure and skill-building exercises in landscape contracting courses. To better prepare students for careers in landscape contracting, we developed a yearly week-long landscape contracting practicum course. The goal of the practicum courses is to expose students to the fundamental concepts as well as the hands-on aspects of a range of landscape contracting topics. We have conducted 12 practicum classes which meet for four-to-five days in the week prior to the start of the fall semester. In the last 12 years, course topics included: water garden construction, irrigation design and installation, and arboriculture (each taught three times); green roofs, hardscape, and landscape pests (each taught once). A distinct advantage to the week-long class format, in contrast with a weekly three-hour lab, is the continuity of the subject matter and start to finish project format. Student feedback has been very positive about the subject matter and skills obtained during the courses. The overall student evaluation of each course has been at least a 3.8 (out of 4.0) for the 12 courses.

The Wood Enterprise Institute (WEI) Internship: A New Model to Foster Partnerships between Firms and Universities

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Abstract: This practice session proposes a new internship model that requires the active participation of students, firms and faculty members. Students will work on the solution of a specific problem in a firm directly supervised by one faculty member and one firm supervisor. During the 12 week internship period, the student will have the option of residing near by the firm or visit the facility at least once a week. Faculty members will travel at least 3 times to will meet with the student in the firm's location to discuss and help the student in achieving the best solution for the assigned problem. Firms may have great consultation from a student and one faculty member during the internship period, increasing the value of the internship.

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