

**FINAL REPORT
STUDY & DEVELOPMENT FELLOWSHIP FOR SESSIONAL LECTURERS
Winter 2012**

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Statement of Fellowship goals

I had three professional development goals:

1. Professional development in critical thinking for higher education.
2. Professional development in more effective delivery of distance education (on-line) courses.
3. Enhancement of my understanding of the current research in the areas of environmental soil science and in food and environmental chemistry.

Given the time constraints of the fellowship I was only able to directly address the first of these two goals.

In the subsequent sections of this report I will summarize my activities related to the first two goals and then I will outline my plans for the development of teaching strategies for each of the three courses I teach on a regular basis.

Critical thinking for higher education

“Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness.” Source: www.criticalthinking.org

I was quite successful in my goal of professional development in critical thinking for higher education.

I had originally proposed attendance at the 32nd Annual International Conference on Critical Thinking in Berkeley, CA in July, 2012. When I investigated this further I discovered that the Foundation for Critical Thinking (www.criticalthinking.org) also runs 3 day workshops throughout the year. I felt that a workshop would be more useful than a conference so I attended “Engaging Students in Taking Ownership of Content through Thinking” workshop from Feb 17 to Feb 19, 2012. I found it to be both an enlightening and somewhat frustrating experience. It was an excellent participatory workshop that taught the fundamental concepts of critical thinking and provided the participants with useful tools and exercises. However I struggled (and continue to struggle) with the challenges of incorporating these ideas into online courses and into large first- and second-year content-driven courses.

I also conducted a review of the Scholarship of Learning and Teaching (SOTL) research on critical thinking in higher education. I read several books and many articles in order to further my understanding of this topic and to identify methods of teaching likely to enhance critical thinking, particularly in first-year chemistry courses.

A concept closely aligned with critical thinking is critical reflection. I was fortunate to meet with Peter Wolf early in the semester to discuss my fellowship and he suggested that I join a COLES book club. The members of the book club were reading and discussing “Becoming a Critically Reflective Teacher” by Stephen Brookfield, the keynote speaker at this year’s Teaching and Learning Conference (Making Connections: 25 Years of Critical Analysis and Reflection). The members of the book club met throughout the semester to discuss the assigned readings and in May we were able to meet with Dr. Brookfield at the conference. I was particularly intrigued by the idea of keeping a teaching and learning journal as a tool for critical reflection of my teaching practice. I will begin keeping a teaching and learning journal in the Fall of 2012.

Distance education (online) teaching

I conducted a review of the Scholarship of Learning and Teaching (SOTL) research on distance education (online) teaching. The research seems to suggest that in terms of educational variables there is little or no difference between traditional classroom-based instruction and technology-supported instruction. However my research provided me with some very useful “best practices” for effective online teaching.

On a more practical level I also participated in several COLES workshops that focused on various online tools:

- Rubrics in CourseLink (D2L) – Feb 22, 2012
- Web-Based Collaboration Tools – Feb 23, 2012
- Facilitating Peer Reviews online with PEAR – May 1, 2012 (at the Teaching and Learning Innovations Conference)
- Lecture Capture Design Cafe & Discussion – May 31, 2012

Very recently (June 4-7, 2012), I was fortunate to attend the Course Redesign Institute run by COLES. I was accepted to the institute to redesign one of my online courses, CHEM1100DE, however I came away with many ideas for my other two courses as well. I will discuss the outcomes of this experience in the subsequent section.

Development of Teaching Strategies

Online Courses – CHEM1100DE and CHEM1060DE

CHEM1100DE (Chemistry Today) is a course for non-scientists and it attempts to outline the involvement of chemistry in our daily lives. Topics include energy sources, air and water pollution, natural and synthetic polymers, household chemicals, foods, drugs and biochemicals.

CHEM1060DE (Introductory Chemistry) stresses the fundamental principles of chemistry and is designed for students without 4U or OAC Chemistry or equivalent. Topics include: atomic theory, the periodic table, stoichiometry, properties of gases and liquids, acid-base concepts and chemical equilibria.

Teaching Strategies for CHEM1100DE and CHEM1060DE:

- During the first week of classes I will ask the students to reflect on the following questions:
 - What are your expectations of me?
 - What are your expectations of the course?
 - What are your expectations of yourself as a learner?I will ask students to submit their answers to these questions. I am wondering about whether I need to assign a grade to this and will discuss this with my Distance Learning Program Development Specialist.
- Collaborative Note-taking – in both courses I am going to add a “low stakes” assignment that involves collaborative note-taking. I will divide the class into small groups and two of these groups will be assigned to each unit of the course. These groups will be responsible for generating a collaborative document (using a tool like wikispaces or googledocs) that summarizes the textbook material for that particular unit. I will oversee this project and will provide feedback to the students participating. These documents will then be made available to all the students in the class. Students will be graded on their participation in the “collaboration”.
- Weekly online lecture – using a tool like Camtasia (lecture capture software) I am going to record weekly “lectures” entitled “The Big Ideas of Unit ?”. This will allow me to summarize the important concepts for the unit and these “lectures” will align nicely with the collaborative note-taking exercise.
- I am going to ask for mid-semester feedback on “what’s going well” and “what could be better” in the course.

Teaching Strategies for CHEM1100DE

- I would like to restructure the course content in order to integrate chemical principles into significant social, political, economic and environmental issues. In the process I hope to prepare students to become well-informed citizens. I realize this is a “lofty” goal and I am not sure that I can complete this task before the next offering of the course (W13). It will involve investigating new textbooks and a complete “rewrite” of the online course content. For this reason I am planning on submitting a DE redevelopment proposal in F12 so that the course will be ready for W14.
- I am going to add a “low stakes” participation assignment that involves several student discussions on newsworthy topics. Students will be required to read a short newspaper/magazine article related to a social, political, economic or environmental issue and will identify and discuss the chemical principles related to this issue.

Classroom Course – SOIL2010

SOIL2010 (Soil Science) provides an introduction to the principles of soil science. Soil is studied as a product of the natural environment, with a focus on formation processes and changes which occur when it is modified through use. Topics include: Soil Description and Classification; Soil Physical Properties; Soil Water; Soil Colloids; Soil Chemistry; Soil Organic Matter; Soil Biology; Soil Nutrients; Soil Degradation.

Teaching Strategies for SOIL2010

- During the first week of classes I will ask the students to reflect on the following questions:
 - What are your expectations of me?
 - What are your expectations of the course?

- What are your expectations of yourself as a learner?

I will ask students to submit their answers to these questions. I am wondering about whether I need to assign a grade to this and will discuss this with my colleagues.

- I am considering the use of lecture capture in this course but need to give more thought to this idea.
- I have begun the process of restructuring the course labs/tutorials. I would like to use at least two of the lab/tutorial periods to fully develop a critical thinking assignment. I have noticed over the years that students have trouble reading and summarizing research articles. I would like to use lab/tutorial time to work on these skills (using small group critical thinking exercises). This skill development will then assist them in an individual critical thinking written assignment.
- I am going to ask for mid-semester feedback on “what’s going well” and “what could be better” in the course.