

College Classroom Course

EPD 654: Teaching in Science and Engineering
Interdisciplinary **L&S 701:** Grad Students in Teaching
Interdisciplinary **CALS 875:** Special Topics
Fall 2005: Tuesdays, 4:00-6:00, 2341 Engineering Hall

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Course Framework

Designed especially for graduate students in STEM disciplines, the College Classroom course provides a forum in which to discuss learning, teaching, and assessment. Cognizant of issues of diversity and equity throughout, participants create a learning community within the class in which to engage in discovery and analysis of the interconnected components of teaching through the lens of teaching-as-research (TAR). After completing this course, participants will be active participants in the interdisciplinary learning community that develops within the course and outside of it, know how to create an inclusive classroom environment that engages all learners, and use TAR in future classrooms of their own.

Course Goals

The main purpose of the College Classroom course is to provide graduate students and post docs with foundational knowledge of a wide range of pedagogical theories, ideas, and practices. An emphasis on a learning-centered classroom provides participants with a perspective that highlights the interconnected cycle of teaching, assessment, and learning. One of the main goals is to help participants become reflective practitioners, viewing their classrooms as sites for ongoing research into their own teaching and assessment in order to increase student learning and understanding. Participants have had the opportunity to investigate, experience, and apply effective assessment, teaching, and learning techniques, improve their teaching in ways that meaningfully enhance student learning, and create an inclusive classroom environment.

Course Objectives

As a result of this teaching and learning experience, students will be able to

- Use the diverse learning habits and backgrounds of students to enhance the classroom learning environment.
- Create an inclusive classroom environment that will engage all students.
- Seek out connections among peers, faculty, and other learners both within and without the discipline.
- View classrooms as sites for ongoing research into teaching using a teaching-as-research approach.

- Develop a deliberate, systematic, and reflective approach to teaching practices that advances the learning experiences and learning outcomes of students.
- Investigate and apply effective assessment, teaching, and learning practices to increase student opportunities and potential for learning.
- Use research as a basis for solving real world teaching and learning issues.
- Be a reflective practitioner, focusing on the many dimensions and challenges inherent in the teaching-learning process.

Course Components

Learning

In the learning component, a focus of the course will be the paradigm shift from instructor-centered to student-centered curricula, various learning theories (e.g., learning as an active process and learning as socially constructed), different learning styles (e.g., auditory, visual, kinesthetic), and common misconceptions (e.g., learning with understanding vs. memorizing).

Assessment

In the assessment component, you will learn about the purposes of assessment (e.g., to guide instruction, enhance learning, provide opportunities to learn, evaluate, and assign grades), the types of assessment (e.g., formative vs. summative, traditional vs. alternative), issues surrounding assessment (e.g., grading and using rubrics) and analyze models of assessment design (e.g., procedurally vs. conceptually difficult questions and levels of conceptualization).

Teaching

In the teaching component, you will learn teaching strategies that promote active learning (e.g., case studies, cooperative learning, concept tests, and problem-based learning), issues of teaching to diverse students (e.g., cultural, gender, and age-related issues), and issues that affect the effectiveness of teaching (e.g., respect of, and attitudes towards students, availability, and clarity of goals and expectations).

Although we will focus on these three components early in the course, they will in fact be interwoven throughout the course as they must be in any effective course.

Special Needs

We wish to fully include persons with disabilities in this course. If you have special circumstances that you believe may affect your performance in this class, please meet with one of the instructors to make necessary accommodations that will enable you to fully participate. We will maintain complete confidentiality of any information you share with us.

Required Course Text/Readings

McKeachie, W. J. (2002). *McKeachie's teaching tips: Strategies, research, and theory for college and university teachers* (11th edition). Boston, MA: Houghton Mifflin Co.

Additional articles will be available through the “content” tab on the course homepage at the Learn@UW site: <http://LearnUW.wisc.edu>.

Course Requirements

We strongly encourage students to focus on one course they will be designing for all of the assignments required in this course. It is much easier to plan one course, as well as see growth when the same class is used consistently.

This course has nine requirements:

- Course readings and discussion questions/comments
- Identify a research question/topic
- Microteaching
- Teaching and learning philosophy
- Learning plans
- Syllabus
- Assessment task
- Grading philosophy paper
- Instructor/faculty observations

Course Readings and Discussion Questions/Comments

Discussion of the readings will be an integral component of the weekly class sessions. You will be expected to reflect on the ideas and research presented in the readings by formulating one question/comment per week based on the assigned readings. You are required to post your question/comment to the class website by the end of the day on the Sunday prior to class. You will be able to see all of your classmates' questions and we encourage you to think about how you might answer their questions or respond to their comments as well as your own.

You will also be expected to use the ideas and the methods in the readings in your assignments for this course. The readings have been deliberately chosen with this goal in mind. You may also incorporate additional readings, perhaps from other courses, to support your particular interests.

Identify a Research Question/Topic

You will need to identify a research question/topic you would like to investigate this semester—something of interest to you in the area of teaching and learning in your discipline. The point of the research question/topic and article is to require you to immediately view the course you are designing as research. Using ERIC and Education Full Text data bases within the MadCat system, you will find a research article that either supports your topic or highlights the need for an answer to your question. For example, is there a strategy that is particularly effective for helping students learn a specific concept in your discipline? How will you know? Have others had success with specific methods? If so, under what conditions? With what kinds of students? What research exists to demonstrate these results?

Microteaching: A Research Approach to Teaching and Learning

Microteaching provides an opportunity to identify a concept, design a teaching strategy (i.e., design the learning plan describing how you will present and assess a particular concept), teach, reflect, and re-design the plan for both student understanding and your continuous improvement. A distinctive feature of this course will be the research approach to microteaching. You will identify questions intended to help you explore effective teaching strategies for yourself and your

students. For example is there a teaching strategy or technique you have learned about that you can apply to teaching a particular concept? What assessment technique/s would help you know that your students understand the concepts? What worked? What didn't? What revisions are appropriate? How successful was the re-design? What questions will you ask your peers as they observe your microteaching experience? Through the microteaching experience you will come to view your classrooms as sites for ongoing research into your own teaching and will work to improve your teaching to increase your students' opportunities and potential for learning.

You will form groups of four, ideally with at least one other person in your discipline. (i.e., one group may have two mathematicians and two engineers; another group may have two biologists and two chemists). In same-discipline pairs, you will work together to design a task appropriate for your field of study. One person from each pair will then teach their task to the other three members of the group (i.e., one chemistry and one biology task will be taught to the three other group members). The presented tasks will be videotaped and all four will discuss the strengths and weaknesses of the tasks and the learning plan. The pairs will reconvene and revise the task. Finally, the same person in each pair who taught the videotaped task will teach the revised task to the whole class. This is repeated so that each student will teach one videotaped original task and one revised whole class task.

After the videotaped lesson, the teaching member of each pair will write a short (one- to two-page) reflection of the strengths and weaknesses of the lesson as originally planned and some changes to be made in the future. Use your group discussion and your viewing of the videotape to guide your reflection. Your reflection is not a play-by-play of your lesson. Instead, it is a statement of how what you did could promote student engagement, provide opportunities for students to learn, highlight misconceptions, capture the attention of students, and increase student learning. Also, when writing your reflection, please distinguish between your reflection on the feedback from peers from your reflection of the video. After teaching both the small group and the whole class lessons, you will hand in your reflections and original and revised learning plans.

Summary

- Design your lesson in pairs
- Teach to small group with videotape
- Hand in reflection and original learning plan
- Revise lesson in pairs
- Teach to our class
- Hand in reflection and revised learning plan

Teaching and learning philosophy

Beliefs, values, goals, and practices as they relate to teaching and learning have come to be known as one's teaching philosophy. Starting in the first week you will write, peer-review, and rewrite your teaching philosophy three times during the semester. The peer-review will allow exposure to a range of ideas, lenses, and perspectives that can be used to refine your philosophy. At the end of the semester, you will have several drafts of your teaching philosophy, the last of which you can use in your job search. Keep in mind that your philosophy may, and in fact,

probably will, change over time, as you gain more experience teaching different courses, teaching to diverse students, and in different environments.

Learning Plan

A learning plan is an organized plan of what, why, and how you are going to teach the topic or concept for a particular day. Included in each learning plan needs to be a list of your goals and objectives for student learning, a description of an opening and concept activity or task, specific examples if appropriate, a means for checking if students understood what it was you taught, and any homework you would assign. You will exchange the first two learning plans you design with others in the class so that you get a sense of how others are designing their plans. The last two will simply be turned in to the instructors.

Syllabus

You will design a syllabus for a course you very likely will teach before earning your degree or more likely, as an assistant professor. The course can be a standard intro course taken by undergraduates, a course you took that you think should be improved, or a course you have not taken but think should be taught.

The syllabus you design is your contract with your students. It informs students of what the goals of the course are and how it is structured, what is required of them in terms of assignments, and how they will be assessed and evaluated. Although most syllabi include similar information, some information is more critical in certain disciplines, thus it is helpful to use a syllabus in your field as an example.

Assessment Task

For this first assessment task assignment, you will bring in an existing assessment that was used either in a class you took or a class you have taught, but must be able to be used in the course you are designing. If you are designing a course you have not taken or taught, design a task that you would use when you do teach it. The assessment task could be a set of take-home problems, an in-class problem or set of problems to be done individually or in groups, a group project, a quiz, or a test. On the day you are to bring the task in, we will analyze the task using different models of item design.

Revised Assessment Task

Using the models of item design discussed in class, you will either redesign the task you brought in for your Assessment Task or design a completely new task. In either case, make sure that the task you design assesses more than one conceptual level and/or addresses at least four of the six features in Bloom's taxonomy as discussed in class. You will need to turn in the original as well as the redesigned task, noting the changes you made from the original to the revised. Please include a few sentences explaining why you made the changes you did.

Grading Philosophy Paper

This 3-5 page paper will describe your philosophy of grading. For example, will you use criterion- or norm-referenced grading? If norm-referenced, how will you determine cut-offs for each grade? If criterion-referenced, how will you determine standards for each grade? For example, if you are using a 90%, 80%, 70%, 60% scale, why are you using it? In other words,

what does an “A” mean? How will you clarify to your students your standards? Will you allow for partial credit or require absolute correctness? Why? Is your grading system fair? Again, why? How will your students benefit?

Keep in mind that a combination of many types of grading techniques may be best suited for your discipline/course/assignments. If that’s the case, clarify which techniques you will use for what.

Instructor/faculty Observations

Critically observing someone teach can be instrumental in improving your own teaching. You will observe two instructors/faculty members and reflect on the degree to which they engage students in active learning, i.e., think about and observe the engagement of the students during the class and take notes of specific examples of such engagement. If the instructor does not use active learning, describe how you could incorporate such practices into the class. If the instructor/faculty members are willing, you may want to share your insights with them. This allows them to gain from the experience as much as (and possibly more than) you.

Course Schedule

Class	Topic/Activities	Readings	Assignments Due (in bold)
Week 1 Sept 6	Welcome; Course overview; ConcepTests	Ellis_ConcepTest CAT	[Note: readings in bold are required ; others are for reference and will extend the ideas in the required articles]
Week 2 Sept 13	Learning paradigm; Active learning	Barr & Tagg _From teaching to learning Crouch & Mazur _Peer instruction Hall_Active learning engineering	Teaching philosophy 1 (two copies—peer review and instructor review) Identification of course for design Research topic and article
Week 3 Sept 20	Assessment	Shepard _Role of classroom assessment; Steen _Assessing assessment Resnick & Resnick_Assessing the thinking curriculum	Learning plan 1 using research topic (two copies) Return teaching philosophy to author with comments and feedback Group A video microteaching, learning plan & reflection for #1, #3
Week 4 Sept 27	Creating an inclusive learning environment	Tobias _They’re not dumb Mills & Ayre _Implementing an inclusive curriculum	Weekly course outline by topic Return learning plan to author Group A class microteaching, learning plan for #1,3 Group B video microteaching, learning plan & reflection for #1, #3
Week 5 Oct 4	Learning styles and intellectual development	Carrizosa _Importance of learning styles Felder _Matters of Style Felder & Brent _Intellectual development of science & engineering students	Learning plan 2 (two copies) Take “Learning styles questionnaire”: www.engr.ncsu.edu/learningstyles/ilsweb.html Group B class microteaching, learning plan for #1,3 Group C video microteaching, learning plan & reflection for #1, #3
Week 6 Oct 11	Authentic learning	Wright _Authentic learning Marchese _New conversations about learning; Zielinski _Mastery learning	Syllabus 1 (two copies) Return learning plan to author Group C class microteaching, learning plan for #1,3 Group D video microteaching, learning plan & reflection for #1, #3
Week 7 Oct 18	Cooperative learning Collaborative sites: wcer.wisc.edu/nise www.foundationcoalition.org/	Newmann _Linking restructuring MacGregor _Collaborative learning Hagelgans _Combining individual Crannell Collaborative oral exams	Teaching philosophy 2 (two copies) Return syllabus to author Group D class microteaching, learning plan for #1,3 Group E video microteaching, learning plan & reflection for #1, #3
Week 8 Oct 25	Problem solving	Schoenfeld _What’s the fuss? Heller _Teaching problem solving Thompson _Learning to teach PS Noddings_Small groups for PS	Learning plan 3 using research topic Return teaching philosophy to author Group E class microteaching, learning plan for #1,3 Group F video microteaching, learning plan & reflection for #1, #3
Week 9 Nov 1	Formative/ Alternative assessment	Black _Inside the black box Kwako _A brief summary of alternative assessments; Butler_Enhancing intrinsic motivation	Syllabus 2 (two copies) Group F class microteaching, learning plan for #1,3 Group A video microteaching, learning plan & reflection for #2, #4
Week 10 Nov 8 (vote!)	Summative assessment/ Assessment task design	Ritter _Quest for an effective form of assessment Kastberg _Using Bloom’s taxonomy	Assessment task (two copies) Return syllabus to author Group A class microteaching, learning plan for #2,4 Group B video microteaching, learning plan &

		Shafer_Changing face of assessment	reflection for #2, #4
Week 11 Nov 15	Grading	Wilson _What gets graded is what gets valued Esty & Teppo _Grade assignment progressive improvement Bonnice _Flexible grade weighting Kroll_Grading cooperative PS	Revised assessment task Learning plan 4 Group B class microteaching, learning plan for #2,4 Group C video microteaching, learning plan & reflection for #2, #4
Week 12 Nov 22	Learning principles and effective teaching strategies	Courter _A compilation of strategies that improve undergraduate education	Grading philosophy paper (for peer review) Group C class microteaching, learning plan for #2,4 Group D video microteaching, learning plan & reflection for #2, #4
Week 13 Nov 29	Reflective teaching	Brookfield _Critically reflective teacher McAlpine _Reflection: issues related to improving teaching	Reflections from faculty observations Return grading philosophy to author Group D class microteaching, learning plan for #2,4 Group E video microteaching, learning plan & reflection for #2, #4
Week 14 Dec 6	State of higher education	Menges _Teaching in higher ed Wright _A novel strategy Shulman_Course anatomy	Grading philosophy paper (to turn in to instructor) Teaching philosophy 3 (two copies) Group E class microteaching, learning plan for #2,4 Group F video microteaching, learning plan & reflection for #2, #4
Week 15 Dec 13	Reflections	Deel _Finding my teaching voice	Return teaching philosophy 3 to author Group F class microteaching, learning plan for #2,4

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