EDCI 411: Knowledge, reasoning, and learning in science
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This course is the first in a three-course sequence required for prospective science teachers enrolled in a teacher education program at the University of Maryland. Just as the professional education of doctors begins with the study of human physiology, the professional education of teachers begins with the study of human cognition. So we’ll focus on primarily on models of how students understand, reason, and learn in science. To that end, we’ll do several sorts of things:

- Read and discuss research on knowledge and reasoning in science;
- Engage in our own reasoning about questions in science, and then step back from that work to think about what we were doing—what goes into our science knowledge and reasoning?
- Analyze examples of student thinking using videotape of activities in science classes as well as samples of students’ written work—what do we see in the students’ knowledge and reasoning?
- Interview secondary students about their thinking about questions in science.
- Observe science classrooms in secondary schools and analyze student learning that arises in these settings.

We’ll be focusing on students, to understand their thinking, because understanding students’ is at the core of what teachers do. The interviews will be especially important in this, both because they provide first-hand data and because conducting interviews will involve developing basic skills of eliciting and listening to student ideas. We’ll also analyze samples of curriculum with respect to how they do or do not address the various aspects of student knowledge and reasoning we have discussed.

Students will be expected to
- Read the assigned literature.
- Interview two students (or other novices) about a science question and write 4-6 pages of analysis.
- Write 4-6 pages of analysis of a piece of curriculum.
- Write two 4-6 analyses of student learning in science class (3-5 pages).
- Participate in conversations and comment on other students’ work.

If at any time you feel that it would be more beneficial to your education to do something differently in the course, please speak to me. This, of course, includes appropriate accommodations for disabilities as well as religious holidays.

Grades
Grades are determined based on the lesson and the five written assignments (interviews, curriculum analysis, and analyses of student learning) and participation in seminar. The four assignments are weighed equally, and count for 90% of the grade; seminar participation for the remaining 10%. Note: I do not put grades on papers, but I comment extensively. Assume that your work is adequate unless I tell you otherwise. If work is incomplete or inadequate I will ask you to redo it.
Readings:

We will probably add to and delete from this list along the way, depending on what comes up in the course. I will e-mail articles well in advance of the day they’re assigned.


Relevant student policies
Religious Observance: The University System of Maryland policy "Assignments and Attendance on Dates of Religious Observance" provides that students should not be penalized because of observances of their religious beliefs; students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances.

We are a diverse community and enroll students of many religions; pursuant to policy, we will do what we can when there are students' requests for excused absences and make-up test requests due to reasons of religious observances. It is the student’s responsibility to inform the instructor of any intended absences for religious observances in advance. Notice should be provided as soon as possible but no later than the end of the schedule adjustment period.

Honor Code: The University is one of a small number of universities with a student-administered Code of Academic Integrity and an Honor Pledge. The Code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. Students should write the following signed statement on the top of each examination or assignment: I pledge on my honor that I have not given or received any unauthorized assistance on this examination (or assignment). Compliance with the code is administered by the Student Honor Council, which strives to promote a “community of trust” on the College Park campus.

Individual Needs Accommodation: The University is legally obligated to provide appropriate accommodations for students with documented disabilities. In order to ascertain what accommodations may need to be provided, students with disabilities should inform the instructors of their needs at the beginning of the semester. The instructor will then consult with Disability Support Services (314-7682). DSS will make arrangements with the student to determine and implement appropriate academic accommodations.

Your participation in the evaluation of courses through CourseEvalUM is a responsibility you hold as a student member of our academic community. Your feedback is confidential and important to the improvement of teaching and learning at the University as well as to the tenure and promotion process. CourseEvalUM will be open for you to complete your evaluations for fall semester courses between Tuesday, December 1 and Sunday, December 13. You can go directly to the website (www.courseevalum.umd.edu) to complete your evaluations starting December 1. By completing all of your evaluations each semester, you will have the privilege of accessing the summary reports for thousands of courses online at Testudo.
Tentative Calendar for EDCI 411, Fall 2009

September 1:
- Review syllabus
- Doing science
- First interview assigned (Due Sept. 22)
- Reading for next week: Carey (1986)
- Discuss Warren & Roseberry (1996)
- Reading for next week: Inquiry in the National Science Education Standards selections

September 3:
- Doing science cont.
- Discuss Carey (1986)
- Observation/analysis of student learning
- Reading for next week: Taber (2000), Clement et al. (1989), Southerland (2001)
- Observation/ analysis of student learning
- Curriculum analysis assigned (Due October 27)

September 8:
- Orientation to blackboard
- Observation/analysis of student learning
- Discuss Taber (2000), Clement et al. (1989), Southerland (2001)

September 10:
- Discuss Taber (2000), Clement et al. (1989), Southerland (2001)
- Reading for next week: Kuhn (1993)
- Discuss NSES selections
- Reading for next week: Hammer & van Zee, Ch. 2

September 15:
- Doing science
- Discuss interview assignment
- Discuss NSES selections
- Reading for next week: Carey & Smith (1993)

September 17:
- Discuss Kuhn 1993
- Reading for next week: Warren & Roseberry (1996)
- Discussion Hammer & van Zee
- Reading for next week: Carey & Smith (1993)

September 22:
- **First Interview due**
- Discussion of interviews
- Second interview assigned
- Second interview assigned

September 24:
- Doing science
- Discuss Hogan & Maglienti
- Doing science
• Reading for next week: Steele (1997)

October 27:
• **Curriculum analysis due**
• Discuss curriculum analysis

October 29:
• Classroom management
• Discuss Steele (1997)
• Reading for next week: Brickhouse et al. (2000)

November 3:
• Observation/analysis of student learning
• Assign analysis of student learning 1 (Due November 12)

November 5:
• Discuss Brickhouse et al. (2000)
• Reading for next week: TBA

November 10:
• Doing science

November 12:
• **Analysis of student learning 1 due**
• Assign analysis of student learning 2 (due December 3)
• Discuss reading
• Reading for next week: TBA

November 17:
• Doing science

November 19:
• Observation/analysis of student learning
• Doing science

November 24:
• Doing science

November 26: NO CLASS- Thanksgiving Break

December 1:
• Observation/analysis of student learning

December 3:
• **Analysis of student learning 2 due**
• Discuss analysis of student learning

December 8:
• TBA

December 10:
• Doing science
• Course evaluations