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Spring 2012
Educational Psychology 590
Seminar in Learning Cognition and Development: Critical Thinking and Instruction

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Goals

This course is designed to help you acquire the following knowledge and skills:

KNOWLEDGE:

- of effective and ineffective reasoning/thinking strategies
- of theories of reasoning and learning to reason
- of empirical results on critical thinking/reasoning and how students learn to think critically/reason
- of instructional methods to promote critical thinking/reasoning

SKILLS:

- evaluating reasoning/thinking
- planning instruction to promote reasoning/critical thinking
- applying good reasoning/critical thinking to the research you are reading about
- applying good reasoning/critical thinking to your own life

Please note that this is a writing intensive course.

Features of an Online Course

An online course differs from a traditional face-to-face course in a number of ways. Critically, for this class:

- A. A strong emphasis on student-driven learning. The instructor role is of overall facilitator and coordinator.
- B. Work at your convenience. But it is important to be engaged **most days during the week**. This is quite different from a traditional course, in which it is perfectly fine to prepare the day before, go to class the day of class, and then not think about the course the other five days a week.
- C. Focus on asynchronous rather than synchronous activities. (This course will--officially--be all asynchronous.)
- D. Students have to do much more of the integrative work. There is a much more disjointed, spread out feel to an online course. This is likely to support long-term memory development, though it may not feel like it at the time.

	Evaluation
1. Discussions of weekly readings (including facilitation and summaries)	20%
2. Weekly collaborative problems (including facilitation and summaries)	15%
3. Weekly journal	15%
4. Application paper	20%
5. Instruction plan	30%

All written assignments must be typed and submitted through the course website. Feedback will be provided on each assignment that you turn in.

1. Discussions of readings

Each week, you will discuss the readings. We will focus on:

- Clarifying understanding of the readings. For research articles, this includes the research question, what the method was, what the results were, and what the appropriate conclusions are.
- Discussing applications and implications of the ideas you have read about.

Each week, you should contribute at least 5 entries (including at least 2 responses) to the discussion threads.

Evaluation will be based on the number of contributions as well as the quality of your contributions.

2. Weekly collaborative problems

In most weeks, you will work collaboratively on an application problem that applies the ideas in the readings. I will set up the groups and the discussion threads that each group can use to work together on the problem. For instance, in the first part of the semester, you will practice evaluating the thinking of students or adults.

Problems will vary in the amount of discussion needed, so I will not state a definite minimum, but it would be rare not to make at least 2 or 3 contributions to the group discussion.

You will take turns leading the group. The group leader is responsible for making sure that the group comes to a conclusion and for summarizing that conclusion at the end. Like discussion facilitators, leaders should question fellow group members and push them to explain their thinking if it is not clear. Leaders should also make sure that groups do not come to closure too quickly.

On some occasions, we may use a wiki outside of eCollege so that you can work collaboratively on a single document.

Evaluation will be based on the number of contributions as well as the quality of your contributions.

3. Weekly journals

These will include a variety of assignments that allow you to apply what you have learned to new problems, to reflect on the readings, to consider applications to your own life, or to reflect on collaborative activities, the course, and your role in discussions. These will typically be about a page in length. The specific assignment will be posted each week. Typically, I will respond to the journal entries with questions which you are to respond to.

4. Application paper

Choose one of the following six topics, and write a paper addressing that topic. Your paper should be 2 to 4 pages, single-spaced, 12-point Times Roman (or Times) font, and one-inch margins on all sides.

1. Choose a major problem or decision in your own past personal or professional life. Analyze this problem or decision in terms of what you have learned about critical thinking and reasoning. Then explain how you could have improved your process. You should choose a problem or decision that is sufficiently complex that you can use a wide range of concepts from the course in your analysis. If you think that there are some important concepts that do not apply to your problem or decision, you may choose to note this and to explain why these concepts are inapplicable.

2. This topic is like Topic #1, except that it focuses on a future situation rather than on a past situation. Choose a problem or decision that is coming up in your life. Analyze this problem or decision in terms of what you have learned about critical thinking and reasoning. Discuss reasoning biases that you might be susceptible to when you are trying to solve this problem, and then discuss how you can use what you have learned in this course to improve your problem solving or decision making. You should choose a problem or decision that is sufficiently complex that you can use a wide range of concepts from the course in your analysis. If you think that there are some important concepts that do not apply to your problem or decision, you may choose to note this and to explain why these concepts are inapplicable.

3. Select a problem solving or decision making group that you belong to (this could be as large as a school or company or as small as a family). Choose a major problem or decision that this group has recently addressed. Analyze this problem or decision in terms of what you have learned about critical thinking and reasoning. Then explain how the group could have improved its process. You should choose a problem or decision that is sufficiently complex that you can use a wide range of concepts from the course in your analysis. If you think that there are some important concepts that do not apply to your problem or decision, you may choose to note this and to explain why these concepts are inapplicable.

4. This topic is like Topic #3, except that it focuses on a future situation rather than on a past situation. Select a problem solving or decision making group that you belong to (this could be as large as a school or company or as small as a family). Choose a problem or decision that this group will soon have to face. Analyze this problem or decision in terms of what you have learned about critical thinking and reasoning. Discuss reasoning biases that the group might be susceptible to when it is trying to solve this problem, and then discuss how the group could use what you have learned in this course to improve its problem solving or decision making. You should choose a problem or decision that is sufficiently complex that you can use a wide range of concepts from the course in your analysis. If you think that there are some important concepts that do not apply to your problem or decision, you may choose to note this and to explain why these concepts are inapplicable.

5. Select a problem or a decision that has been discussed in the media. The problem or decision could be one that has been faced by a government body, by a corporation, or by a nongovernmental organization. Analyze this problem solving or decision making process in terms of what you have learned about critical thinking and reasoning. Discuss how the problem solving or decision making process could have been improved. You should choose a problem or decision that is sufficiently complex that you can use a wide range of concepts from the course in your analysis. If you think that there are some important concepts that do not apply to your problem or decision, you may choose to note this and to explain why these concepts are inapplicable. If you choose this option, you will need to read enough sources to have a good understanding of the problem solving or decision making process.

6. Consider student work that you have observed in any class you have taught or observed. Analyze the student work in terms of what you have learned about critical thinking and reasoning. What are the characteristics of the students' thinking? How does their thinking differ from expert thinking? You should choose a domain (an area of student reasoning or knowledge) that is sufficiently complex that you can use a wide range of concepts from the course in your analysis. If you think that there are some important concepts that do not apply to the situation, you may choose to note this and to explain why these concepts are inapplicable.

Your paper will have two broad sections. One part will be an analysis of the actual thinking processes that were used or are likely to be used, both good and bad. The other part will be an analysis of ways in which the problem solving/decision making/reasoning process could be improved. Each part will be evaluated according to following criteria:

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| 1. How many relevant concepts/biases have you discussed? | (10%) |
| 2. Have you chosen the most relevant concepts/biases? | (10%) |
| 3. How accurately have you described the concepts/biases? | (15%) |
| 4. How concrete and detailed is your discussion of the concepts/biases? | (10%) |
| 5. Spelling, style, grammar. | (5%) |

With the two parts, the total will be 100%.

5. Instructional plan

This assignment provides you with experience in designing instruction to promote reasoning/critical thinking. Your paper should be single-spaced, 12-point Times Roman (or Times) font, 1-inch margins on all sides. (Note, however, that sample materials to be handed out to students need not follow these formatting guidelines.)

You will do the following:

1. Choose a strategy or set of strategies that you would like students you are working with to learn. The students can be of any age level.
2. Plan a series of lessons that will promote learning of this strategy or these strategies. Your plan should include a plan to gather data that can provide you with information about how successful the instruction has been.
3. Write a paper that provides a theoretical rationale for your choice of strategies as well as your choice of instructional methods. This paper should involve the write a literature review that summarizes and integrates the literature on your topic. About 5-8 new articles or chapters, in addition to others assigned in the course, should be read in preparation for this paper; one or more of these papers should be selected to provide you with ideas about how to assess the reasoning strategies you have targeted.

4. Write:

- your theoretical rationale for the chosen strategies (1-2 pages), including citations.
- an overview of your planned lesson, along with a theoretical rationale for the instructional strategies you have chosen (3-6 pages).
- a description of your lessons (4-10 pages)
- an overview of the assessment plan (1-3 pages)
- a sample (at least) of materials to be used, including an example of a handout and an example of an assessment (at least 3 pages; can be more)
- your reference list.

5. During this course, we will generate one or more rubrics that can be used to evaluate these lesson plans. A peer will evaluate the lesson plan using this rubric, and provide suggestions.

6. You will respond with some modifications.

7. NOTE: I will individually communicate extended requirements for students in doctoral programs.

Your project will be evaluated according to these categories:

1. 10%. Does the instructional plan address an important strategy that your students need to learn and that they are capable of learning? Does your introduction clearly demonstrate the importance of this strategy and provides evidence that it is not trivial for students to learn the strategy?

2. 15% Does the paper discuss some research on the target strategy (possibly including related strategies) and how students learn these strategies? Does the paper note other approaches that have been taken (if any) to teach these strategies?

3. 30% Does the paper provide a detailed overview of the proposed lessons? Does the overview include a discussion of instructional methods employed, together with a theoretical rationale for the use of these methods? Would a teacher be able to use the overview to actually take the final steps to design and present instruction?

4. 10% Is it likely that the proposed instructional plan would be effective, given what we know about . Has the paper provided a sufficient case that the lesson would be effective?

5. 15% Is the assessment plan clearly presented? Are the rubrics presented clear and workable? Would it allow the teacher to gain a picture of what each student is learning related to the targeted strategies?

5. 20% Are the handouts and assessments well designed? Do they show use of effective instructional scaffolds and other instructional aids?

General Expectations for Written Work

Here are some general expectations for written work.

- Length: On work done on word processors, I will be flexible on length only on the instructional plan. Be sure to follow page guidelines, with single spacing, with 12-point Times Roman (or Times) font and one-inch margins on all sides. You may include additional lines between sections and headers.
- Responsiveness to the task or question: Are you fulfilling the requirements of the assignment?
- Clarity and organization of writing
- Conciseness – try to write in a non-repetitive way.
- Completeness and depth - present the necessary amount of detail to support your points. Write as though your audience is not an expert on your topic and in a way that demonstrates depth of analysis of the topic. Bring in psychological evidence and justify your view using psychology, not rumors.
- Independent judgment – go beyond the information presented by others. Be critical, seeing both strengths and weaknesses and support opinions with your own reasons.
- Relevance – connection between your examples and the content of the course should be clear.
- Attention to professional style and ethics. Quotes must have appropriate references. Paraphrasing, you still **MUST** acknowledge original work. **Plagiarism will be dealt with in accordance with the University policy.** Here's a thinking tool to help you decide whether you have quoted inappropriately. Suppose Google had every word ever written on its servers (all published and unpublished writing, from all of history through this moment). Would a Google search on any series of words from your document yield a hit?
- Critical reading – are you evaluating strengths/weaknesses of the material you are reading? Are you being objective in your discussions of the material?
- On lateness – if you need an extension of time on an assignment please contact me before the date when the assignment is due.

Important Notes

1. Some requirements and procedures may be adjusted as we find out how things are working this semester.
2. There may be technological hiccups to work through the first few weeks.
3. In a small class, I like to hold off on formally announcing later readings so that I can adjust readings to the topics that are being discussed.

Course Schedule

Week	General Topic	Specific Topic	READINGS and JOURNALS due by Thursday	Discussions & Collab-orative Problems	Other assignments
Week 1. Class: Jan 19	General issues in critical thinking and reasoning	Reasoning biases		Week 1 Discussion	Post self-introductions
Week 2 Readings due: Jan 26		Critical thinking and reasoning strategies	Ennis (1987) Facione (2007) Paul & Elder (2001)		
Week 3 Readings due: Feb 2		Argumentation	Fisher (1988) Kuhn (1992) Toulmin et al. (1984)	Week 2 Discussion Week 2 Collab. Prob.	
Week 4 Readings due: Feb 9	Reasoning in domains	Science	Reif & Larkin (1991) Schauble (1990)	Week 3 Discussion Week 3 Collab. Prob.	
Week 5 Readings due: Feb 16		History	Wineburg (1991) Wineburg (1998)	Week 4 Discussion Week 4 Collab. Prob.	
Week 6 Readings due: Feb 23		Social world	Voss et al. (1983) Tetlock (1993)	Week 5 Discussion Week 5 Collab. Prob.	
Week 7 Readings due: Mar 1		Mathematics	Muis (2004) Selected Research Samplers from the Mathematical Association of America Excerpt from Collins, Brown, & Newman (1989)	Week 6 Discussion Week 6 Collab. Prob.	
Week 8: Readings due: Mar 8	General issues (reprise)	Fuzziness of reasoning	Dawes (1996) Collins 1975 Collins & Pinch	Week 7 Discussion	Application paper is due.
		Teaching modeling			
Week 9 Readings due: Mar 22	Instruction	Teaching modeling	Lehrer & Schauble (2004) Selection from Lehrer & Schauble (2002) TBA	Week 8 Collab. Prob.	
Week 10 Readings due: Mar 29		Teaching strategies	Collins, Brown, & Newman (1989) Chinn (2007c)--Strategy instruction TBA	Week 9 Discussion Week 9 Collab. Prob.	
Week 11 Readings due: Apr 5		Instruction and Assessment	Wilson & Sloane (2000) Ayala & Brandon (2008)	Week 10 Discussion Week 10 Collab. Prob.	
Week 12 Readings due: Apr 12		Scaffolding; Collaborative learning	Britt & Aglinskis (2002) Chinn (2007d)-- Collaborative learning	Week 11 Discussion Week 11 Collab. Prob.	

Week 13 Readings due: Apr 19		Goal setting; Discussions	Page-Voth & Graham (1999) Waggoner et al. (1995) TBA	Week 12 Discussion Week 12 Collab. Prob.	
Week 14 Readings due: Apr 26		Teaching about evidence and epistem- ology	Schwartz & White (2005) TBA	Week 13 Discussion	
Week 15: Class & Readings due: May 3			TBA		

Reading List

- Britt, M. A., & Aglinskas, C. (2002). Improving students' ability to identify and use source information. *Cognition and Instruction, 20*, 485-522.
- Chinn, C. A. (2008a--in preparation). Complex cognitive strategies and self-regulated learning. In *Educational psychology: Understanding Student Thinking*. Columbus, OH: Merrill.
- Chinn, C. A. (2008b--in preparation). Excerpt from Prior conceptions and their effects on learning. In *Educational psychology: Understanding Student Thinking*. Columbus, OH: Merrill.
- Chinn, C. A. (2008c--in preparation). Excerpt from Strategy instruction. In *Educational psychology: Understanding Student Thinking*. Columbus, OH: Merrill.
- Chinn, C. A. (2008d--in preparation). Collaborative learning. In *Educational psychology: Understanding Student Thinking*. Columbus, OH: Merrill.
- Collins, A., Brown, J. S., & Newman, S. E. (1989). Cognitive apprenticeship: Teaching the crafts of reading, writing, and mathematics. In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 453-494). Hillsdale, NJ: Erlbaum.
- Dawes, R. (1996). *House of Cards: Psychology and psychotherapy built on myth*. Free Press. Chapter 3
- Ennis, R. H. (1987). A taxonomy of critical thinking dispositions and attitudes. In J. B. Baron & R. J. Sternberg (Eds.), *Teaching thinking skills: Theory and practice* (pp. 9-26). New York: Freeman.
- Facione, P. A. (2007). *Critical thinking: What it is and why it counts*: Insight Assessments, California Academic Press.
- Fisher, A. (1988). *The logic of real arguments*. Cambridge: Cambridge University Press.
- Kuhn, D. (1992). Thinking as argument. *Harvard Educational Review, 62*, 155-178.
- Kuhn, D., & Udell, W. (2003). The development of argument skills. *Child Development, 74*, 1245-1260.
- Lehrer, R., & Schauble, L. (2004). Modeling natural variation through distribution. *American Educational Research Journal, 41*, 635-679.
- Lehrer, R., & Schauble, L. (Eds.). (2002). *Investigating real data in the classroom*. New York: Teachers College Press.
- Muis, K. R. (2004). Personal epistemology and mathematics: A critical review and synthesis of research. *Review of Educational Research, 74*, 317-377.
- Page-Voth, V., & Graham, S. (1999). Effects of goal setting and strategy use on the writing performance and self-efficacy of students with writing and learning problems. *Journal of Educational Psychology, 91*, 230-240.
- Paul, R., & Elder, L. (2001). Critical thinking concepts and tools. From www.criticalthinking.org
- Reif, F., & Larkin, J. H. (1991). Cognition in scientific and everyday domains: Comparison and learning implications. *Journal of Research in Science Teaching, 28*, 733-760.
- Schauble, L. (1990). Belief revision in children: The role of prior knowledge and strategies for generating evidence. *Journal of Experimental Child Psychology, 49*, 31-57.
- Schwartz, C. V., & White, B. Y. (2005). Metamodeling knowledge: Developing students' understanding of scientific modeling. *Cognition and Instruction, 23*, 165-205.
- Tetlock, P. E. (1993). Cognitive structural analysis of political rhetoric: Methodological and theoretical issues. In S. Iyengar & W. J. McGuire (Eds.), *Explorations in political psychology* (pp. 380-405). Durham, NC: Duke University Press.
- Tetlock, P. E. (2005). *Expert political judgment: How good is it? How can we know?* Princeton, NJ: Princeton University Press.
- Toulmin, S., Rieke, R., & Janik, A. (1984). *An introduction to reasoning* (2nd ed.). New York: Macmillan.

- VanSledright, B. A., & Franks, L. (2000). Concept- and strategic-knowledge development in historical study: A comparative exploration in two fourth-grade classrooms. *Cognition and Instruction, 18*, 239-283.
- Weber, K. (2008). Student's difficulties with proof. Retrieved January 20, 2008, from http://www.maa.org/t_and_1/sampler/rs_8.html
- Wilson, M., & Sloane, K. (2000). From principles to practice: An embedded assessment system. *Applied Measurement in Education, 13*, 181-208.