EDUC16:
EDUCATIONAL PSYCHOLOGY

Fall Term, 2012	David J.M. Kraemer, PhD
Monday, Wednesday, Friday	*david.kraemer@dartmouth.edu*
MWF 1:45-2:50, X-hr: Th 1:00-1:50	Office: 205 Raven House
110 Moore	*Office hours: M,W 3:00-4:30*

COURSE DESCRIPTION

How do we learn? How can modern educational settings harness recent innovations concerning the essence of human learning? Educational psychology provides a foundation for applying the psychological principles that underlie learning in both formal and informal educational settings. In this course, we will explore the multitude of ways that people learn, the effects of different types of teaching strategies on learning, and the impact of individual differences on learning. We will also explore assessment, creativity and problem solving, as well as cultural and motivational influences on learning across diverse educational situations. Underlying the course will be an account of the way the human mind works, changes, and adapts in different settings. This includes the home, the school, the university and any context in which explicit or implicit education takes place.

COURSE GOALS

This course challenges students to think critically about the relationship between what we know about the mind from experimental research and how we teach students to learn in actual classroom settings. In-class discussion of assigned readings is a critical component of this course. We will discuss such topics as how people learn, how knowledge is stored and organized in the mind, how schools have used and could use the findings of psychological research to improve student learning, and what should be the aims of the fields of Educational Psychology and Educational Neuroscience. Developing the skills of critically reading empirical research articles and writing a research paper are central to achieving these course goals.

GRADING OVERVIEW

15% Class Presentations (2) & Participation
12% Short Opinion Paper
20% Final Research Paper
20% Midterm Examination
33% Final Examination

GENERAL POLICIES

1. **Read all materials and prepare for class.** You are expected to read the materials posted on Blackboard *before* each class. Be prepared to discuss that material *in class*. Everyone is expected to come to every class and to arrive on time. You are also expected to contribute to class discussion. You will learn the material better and others will learn from you. The success of this course depends on everyone coming to class prepared and ready to discuss the material. Both attendance (on-time) and preparation for class will determine a portion of your grade (see "Assignments and Assessments" below).
2. **Tell me sooner rather than later.** If you know ahead of time that you will be missing a class, e.g., for sports or religious observance, please let me know in advance in order to avoid losing course credit.
3. ***ASSUME THAT I WILL NOT ACCEPT LATE ASSIGNMENTS.***
4. **Cell phones are not to be used in class.** If an emergency arises that requires the use of a phone, please quietly excuse yourself from the room to respond.
5. **Accommodations.** Students with learning, physical, or psychiatric disabilities enrolled in this course who may need disability-related classroom accommodations are encouraged to make an office appointment to see me early in the semester (i.e., within the first two weeks). If you have not done so already, students requiring disability-related accommodations should register with the Student Accessibility Services office regarding Dartmouth's policies and available resources: http://www.dartmouth.edu/~accessibility/
6. **Plagiarism is unacceptable.** All work submitted as your own must be written by you and not previously submitted for any other class. It is important to attribute material that is the work of others to the original source. If you are unsure how to properly cite a source, please consult with me prior to handing in an assignment. You should be familiar with Dartmouth's Academic Honor Principle, which applies to all courses at Dartmouth (available here: www.**dartmouth**.edu/~uja/**honor**/). I do not expect any violations of this code, but if any concerns do arise I will forward all related materials to Dartmouth's Committee on Standards.
7. **Before you turn in your papers…** make sure that you use 12-point Times New Roman font, that you double-space the whole document, that your print margins are 1-inch on all sides (not the default in *Word)*, that all your pages are numbered, and that your document is stapled together (if printed). For citations in all papers, you must use APA Style formatting (refer to the APA Style Manual or online guides, such as: http://owl.english.purdue.edu/owl/resource/560/01/)

ASSIGNMENTS and ASSESSMENTS

Class Presentations & Participation (15%):

- 10% is earned by leading two class discussions *(5% each)*:
  - During most class periods, pairs of students will present critical readings of assigned articles – each student is responsible for one article
  - Everyone will present twice during the term
  - Each presentation will include a summary of the main findings of the article including the goal of the study, an overview of the methods, and a description of the main findings
  - The presentation will also include a critique of the study highlighting design aspects that were particularly well-executed or interesting, design aspects that seem flawed, and a critical evaluation of the implications of the findings as compared to the authors' interpretations of the results (i.e., Do the conclusions make sense in light of the data provided?, Can this be applied to education?).
- In addition (5%), everyone is always expected to:
  - Arrive on time for each class
  - Prepare for class discussions that you are not leading and be attentive (read the assigned materials, stay awake during class, stay off internet, etc.)

Short Opinion Paper (12%) – *FRIDAY, SEPTEMBER 28th (topic chosen by FRI, SEPT 21st)*

- A 2-3 page paper responding to a topic of choice from those discussed in class
- Paper must cite at least 3 new sources (articles, book chapters, or news reports)
- Full credit will be given for the above criteria and submitting the paper on time.
- This is meant as a low-stakes opportunity for me to track your understanding of the material and to provide feedback on writing for a scientific audience.

Mid-term examination (20%) – *MONDAY, OCTOBER 15th*:

- Covers all classes up to the date of the exam
- 5 short answer questions *(2pts. each)*
- 10 fill-in-the-blank questions *(1pt. each)*

Final Writing Assignment (20%) – *FRIDAY, NOVEMBER 16th (topic by FRI, OCT 26th)*:

- Choose a research question that interests you for which the scientific community does not yet know the answer. (Consult with me prior to settling on a topic.)
- Perform a literature search for at least 4 relevant articles not previously assigned in this class and write a roughly 8-page literature review aimed at providing the background information and debate surrounding your question.
- At the conclusion of your paper, briefly discuss the type of study (or studies) that would be needed to resolve the issue, and how this would impact education.
- An example topic would be, "Is using a teaching method that differentiates instruction based on learning styles more effective than a method that does not?"

Final examination (33%) – *FRIDAY, NOVEMBER 16th @ 3pm*:

- A section covering only material since the midterm *(20%)*, rest is cumulative *(13%)*
- Mix of short essay and fill-in-the-blank questions

SCHEDULE

Monday, September 10

INTRODUCTION
Agenda: Course overview, review syllabus, choose discussion topics

Wednesday, September 12

Readings: LEARNING AND THE BRAIN *(Kraemer)*

1) Bruer, J.T. (1997). Education and the Brain: A Bridge Too Far. *Educational Researcher, 26(8),* 4-16.
2) Ansari, D., & Coch, D. (2006). Bridges over troubled waters: education and cognitive neuroscience. *Trends in Cognitive Sciences*, 10*(4)*, 146–151.

Lecture: LEARNING AND THE BRAIN

Friday, September 14.

Discuss upcoming short paper assignment
Discuss Readings: LEARNING AND THE BRAIN *(Kraemer)*

1) Fischer, K.W., Goswami, U., Geake, J., et al. (2010). The Future of Educational Neuroscience. *Mind, Brain, and Education*, *4(2)*, 68-80.
2) Willingham, D. T., & Lloyd, J. W. (2007). How educational theories can use neuroscientific data. *Mind, Brain, and Education*, *1*(3), 140–149.

Lecture: KIDS AS EARLY LEARNERS: THE PHYSICAL AND PSYCHOLOGICAL WORLD

Monday, September 17

Discuss Readings: KIDS AS EARLY LEARNERS

1) Kuhn, D. (2006). Do cognitive changes accompany developments in the adolescent brain? *Perspectives on psychological Science*, 1, 59-67.
2) Carey S. (2004). Bootstrapping and the origin of concepts. *Daedalus*, Winter, 59-68.
3) Shaw, P., Greenstein, D., Lerch, J., Clasen, L., Lenroot, R., Gogtay, N., Evans, A., Rapoport, J. & Giedd, J. (2006). Intellectual ability and cortical development in children and adolescents. Nature, 440(30), 676-679.

Lecture: ASSOCIATIVE LEARNING AND REINFORCEMENT

Wednesday, September 19

Discuss Readings: ASSOCIATIVE LEARNING AND REINFORCEMENT

1) Olson, M. & Fazio, R. (2001). Implicit attitude formation through classical conditioning. *Psychological Science*, 12, 413-417.
2) Schultz, W. (2007). Behavioral dopamine signals. *Trends in Neuroscience*, 30, 203-210.

Lecture:EDUCATIONAL APPLICATION:REINFORCEMENT & ASSOCIATIVE LEARNING

Friday, September 21 - **_SHORT OPINION TOPICS APPROVED BY THIS DATE_**

Discuss Readings: ED. APPLICATION: REINFORCEMENT & ASSOCIATIVE LEARNING

1) McAllister, L., Stachowiak, J., Baer, D., & Conderman, L. (1969). The application of operant conditioning techniques in a secondary school classroom. *The Journal of Applied Behavioral Analysis*, 2(4), 277-285.
2) Standley, J. M. (1996). A meta-analysis on the effects of music as reinforcement for education/therapy objectives. *Journal of Research in Music Education*, *44*(2), 105–133.

Lecture: MOTIVATION: INTRINSIC vs. EXTRINSIC

Monday, September 24

Discuss Readings: MOTIVATION: INTRINSIC vs. EXTRINSIC

1) Ames, C.A. (1990). Motivation: What teachers need to know. *Teachers College Record*, 91(3), 409-421.
2) Covington, M. (2000). Intrinsic versus extrinsic motivation in schools: A reconciliation, *Current Directions in Psychological Science*, 9, 22-25.

Lecture: INFORMATION ACQUISTION

Wednesday, September 26

Discuss Readings: INFORMATION ACQUISTION

1) Silvia, P.J. (2008). Interest: the curious emotion. *Current Directions in Psychological Science*, 17, 57-60.
2) Rohrer, D. & Pashler, H. (2007). Increasing retention without increasing study time. Current Directions in Psychological Science, 16, 183-186.
3) Cepeda, N.H., Pashler, H., Vul, E., & Wixted, J.T. (2006). Distributed practice in verbal recall tasks: a review and quantitative synthesis. Psychological Bulletin, 132, 354-380.

Lecture: STORING KNOWLEDGE

Friday, September 28 – **_SHORT OPINION PAPER DUE_**

Discuss Readings: STORING KNOWLEDGE

1) Thompson-Schill (2003). Neuroimaging studies of semantic memory: Inferring "how" from "where". *Neuropsychologia*, 41, 280-292.
2) Smith, Glenberg, & Bjork. (1978). Environmental context and human memory. *Memory & Cognition*, 6(4) 342-353.

Lecture: LEARNING STRATEGIES

Monday, October 1

Discuss Readings: LEARNING STRATEGIES

1) Kornell, N. & Son, L.K. (2009). Learners' choices and beliefs about self-testing. *Memory*, 17(5), 493-501.
2) Young, A. (1997). I think, therefore I'm motivated: The relations among cognitive strategy use, motivational orientation, and classroom perceptions over time. *Learning and Individual Differences*, 9, 249-283.
3) Zimmerman, B.J. (1990). Self-regulated learning and academic achievement: an overview. Educational Psychologist, 25, 3-17.

Lecture: LEARNING THROUGH DIRECT EXPERIENCE

Wednesday, October 3

Discuss Readings: LEARNING THROUGH DIRECT EXPERIENCE

1) Carpenter, T. P., Fennema, E., & Franke, M. L. (1996). Cognitively guided instruction: A knowledge base for reform in primary mathematics instruction. The Elementary School Journal, 3–20.
2) Malcolm, P., Moher, T., Bhatt, D., Uphoff, B., & López-Silva, B. (2008). Embodying scientific concepts in the physical space of the classroom. In Proceedings of the 7th International Conference on Interaction Design and Children (pp. 234–241). Retrieved from http://dl.acm.org/citation.cfm?id=1463761

Lecture: EDUCATIONAL IMPORTANCE OF BACKGROUND KNOWLEDGE

Friday, October 5

Discuss Readings: EDUCATIONAL IMPORTANCE OF BACKGROUND KNOWLEDGE

1) Hogan, T. Rabinowitz, M. & Craven, J.A. (2003). Representation in teaching: inferences from research of expert and novice teachers. Educational Psychologist, 38, 235-247.
2) Hirsch, E. D., Apple, M. W., & Rochester, J. M. (2005). Education reform and content: The long view. Brookings papers on education policy, (8), 175–207.

Lecture: SOCIAL PROCESSES IN KNOWLEDGE CONSTRUCTION

Monday, October 8

Discuss Readings: SOCIAL PROCESSES IN KNOWLEDGE CONSTRUCTION

1) Palinscar, A.S. & Brown, A.L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. Cognition and Instruction, 1, 117-175.
2) Shah, P.P., Dirks, K.T., & Chervany, N. (2006). The multiple pathways of high performing groups: the interaction of social networks and group processes. *Journal of Organizational Behavior*, *27*(3), 299–317.

Lecture: RETRIEVING KNOWLEDGE

Wednesday, October 10

Discuss Readings: RETRIEVING KNOWLEDGE

1) Rawson, K. & Kintsch, W. (2005). Rereading effects depend on time of test, Journal of Educational Psychology, 97(1), 70-80.
2) O'Craven, K.M., & Kanwisher, N. (2000). Mental imagery of faces and places activates corresponding stimulus-specific brain regions. *Journal of Cognitive Neuroscience*, 12(6), 1013-1023.
3) Semb, G., Ellis, J., Araujo, J. (1993). Long-term memory for knowledge learned in school, Journal of Educational Psychology, 85(2), 305-316.

Lecture: FORGETTING

Friday, October 12

Discuss Readings: FORGETTING

1) Roediger, H. & McDermott, K. (2000).Tricks of memory. Current Directions in Psychological Science, 9(4), 123-127.
2) Altmann, E. & Gray, W. (2002). Forgetting to remember: the functional relationship of decay and interference, Psychological Science, 13(1), 27-33.

Lecture: EXPERTISE: LEARNING AS A NOVICE vs. LEARNING AS AN EXPERT

Monday, October 15

****MIDTERM EXAM****

Wednesday, October 17

Midterm Exam Recap

Lecture: ATTENTION AND MULTI-TASKING

LAST DAY TO DROP 4th CLASS (without receiving a "W"): THURSDAY, OCTOBER 18th

Friday, October 19

Discuss Readings: ATTENTION AND MULTI-TASKING

1) Posner, M. I. (1994). Attention: The mechanisms of consciousness. *Proceedings of the National Academy of Sciences, 91*(16), 7398.
2) Mayer, R. E., & Moreno, R. (2003). Nine Ways to Reduce Cognitive Load in Multimedia Learning. *Educational Psychologist*, *38*(1), 43–52.

Lecture: MODELS AND MEASURES OF WORKING MEMORY

Monday, October 22

Discuss Readings: MODELS AND MEASURES OF WORKING MEMORY

1) Baddeley, A., & others. (2003). Working memory: Looking back and looking forward. *Nature Reviews Neuroscience*, *4*(10), 829–839.
2) D'Esposito, M. (2007). From cognitive to neural models of working memory. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *362*(1481), 761.

Lecture: EDUCATIONAL IMPLICATIONS OF WORKING MEMORY PROBLEMS

Wednesday, October 24

Discuss Readings: EDUCATIONAL IMPLICATIONS OF WORKING MEMORY

1) Gathercole, S. E., & Alloway, T. P. (2008). Working memory and classroom learning. *Applied cognitive research in K-3 classrooms*, 17–40.
2) Alloway, T. P., Gathercole, S. E., Kirkwood, H., & Elliott, J. (2009). The working memory rating scale: A classroom-based behavioral assessment of working memory. *Learning and Individual Differences*, *19*(2), 242–245.

Lecture: HIGHER-ORDER REASONING

Friday, October 26 - **FINAL PAPER TOPICS MUST BE APPROVED BY THIS CLASS**

Discuss Readings: HIGHER-ORDER REASONING

1) Ramnani, N., & Owen, A. M. (2004). Anterior prefrontal cortex: insights into function from anatomy and neuroimaging. *Nature Reviews Neuroscience*, *5*(3), 184–194.
2) Green, A. E., Fugelsang, J. A., Kraemer, D. J. ., Shamosh, N. A., & Dunbar, K. N. (2006). Frontopolar cortex mediates abstract integration in analogy. *Brain research*, *1096*(1), 125–137.

Lecture: TRANSFER

Monday, October 29

Discuss Readings: TRANSFER

1) Gentner, D., Loewenstein, J. & Thompson, L. (2003). Learning and transfer: A general rule for analogical encoding. Journal of Educational Psychology, 95, 393-405. 8
2) Mayer, R.E. (2004). Teaching of subject matter. Annual Review of Psychology, 55, 715-744.

Lecture: CREATIVITY

LAST DAY TO WITHDRAW (without a petition): TUESDAY, OCTOBER 30th

Wednesday, October 31

Discuss Readings: CREATIVITY

1) Hennessey, B.A. & Amabile, T.M. (2010). Creativity. Annual Review of Psychology, 61, 569-598.
2) Green, A. E., Kraemer, D. J. M., Fugelsang, J. A., Gray, J. R., & Dunbar, K. N. (2010). Connecting long distance: semantic distance in analogical reasoning modulates frontopolar cortex activity. *Cerebral Cortex (New York, N.Y.: 1991)*, *20*(1), 70–76.

Lecture: MODELS AND MEASURES OF INTELLIGENCE

Friday, November 2

Discuss Readings: MODELS AND MEASURES OF INTELLIGENCE

1) Nisbett, R. E., Aronson, J., Blair, C., Dickens, W., Flynn, J., Halpern, D. F., & Turkheimer, E. (2012). Intelligence: New findings and theoretical developments. Retrieved from http://psycnet.apa.org/psycinfo/2011-30298-001/
2) Gray JR, Chabris CF, Braver TS. (2003). Neural mechanisms of general fluid intelligence. *Nature Neuroscience*. *6*(3):316-22.

Lecture: IS INTELLIGENCE MALLEABLE?

Monday, November 5

Discuss Readings: IS INTELLIGENCE MALLEABLE?

1) Jaeggi, S. M., Buschkuehl, M., Jonides, J., & Perrig, W. J. (2008). Improving fluid intelligence with training on working memory. *Proceedings of the National Academy of Sciences*, *105*(19), 6829.
2) Owen, A. M., Hampshire, A., Grahn, J. A., Stenton, R., Dajani, S., Burns, A. S., Howard, R. J., et al. (2010). Putting brain training to the test. *Nature*, *465*(7299), 775–778.

Lecture: LEARNING STYLES –IS THERE A THERE THERE?

Wednesday, November 7

Discuss Readings: LEARNING STYLES

1) Carpenter, T. P., Fennema, E., & Franke, M. L. (1996). Cognitively guided instruction: A knowledge base for reform in primary mathematics instruction. The Elementary School Journal, 3–20.
2) Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2009). Learning styles: Concepts and evidence. Psychological Science in the Public Interest, 9, 105-119.

Lecture: GENDER DIFFERENCES IN LEARNING

Friday, November 9

Discuss Readings: GENDER DIFFERENCES IN LEARNING

1) Halpern, D. & LaMay, M. (2000). The smarter sex: a critical review of differences in intelligence. Educational Psychology Review, 12(2), 229-246.
2) Conlin, M. The New Gender Gap, *Business Week*, May 26, 2003.
3) Begley, S., Pink Brain, Blue Brain. Newsweek, September 14, 2009.---

Lecture: NEUROETHICS AND EDUCATION

Monday, November 12

Discuss Readings: NEUROETHICS AND EDUCATION

1) Greely, H., Sahakian, B., Harris, J., Kessler, R. C., Gazzaniga, M., Campbell, P., & Farah, M. J. (2008). Towards responsible use of cognitive-enhancing drugs by the healthy. Nature, 456(7223), 702–705.
2) Wolpe, P. R. (2006). Reasons scientists avoid thinking about ethics. Cell, 125(6), 1023–1025.
3) Talbot, M. (2009). Brain gain. The New Yorker, 32–45.

Course Evaluations

Friday, November 16 - **_FINAL PAPERS DUE_**

****FINAL EXAM @ 3pm****