Mind, Brain and Education
EdPsych 326 – Fall 2013
Mon/Wed 8:00-9:15 am
Educational Sciences 228 (TBC)

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Mind, Brain and Education
Mind, Brain and Education is an emerging field that bridges neuroscience, psychology and education. The field seeks to apply these findings to educationally relevant questions and to investigate the idea that educational experiences fundamentally change brain structure and function. This course, which counts towards the newly approved Education and Educational Services certificate program, will examine questions like: What do we know about how the brain learns? How do these brain systems get put into place? How do individual differences in neural circuitry relate to children's learning success or difficulties? What are neuromyths and can we use knowledge of the brain to help improve teaching?

Because this introductory course that spans multiple content areas, we will read two recent textbooks from researchers in each of the main fields represented in this course. The first is written by an educator who returned to complete a PhD in Mind, Brain and Education, and the other is written by two neuroscientists who study the brain circuits that support learning and other relevant cognitive abilities. Classes will consist largely of lectures, with some small group discussions and demonstrations/activities.

Reading Assignments
Reading assignments are listed by date in the course schedule below. Complete each reading assignment ***before*** the date for which it is listed in order to get the most out of the lectures and discussions. It is absolutely imperative that you keep current in your reading.

The primary readings for this course will be two required textbooks:
Tokuhama-Espnosa, T. (2011). *Mind, Brain and Education Science: A Comprehensive Guide to the New Brain-Based Teaching.* New York: W.W. Norton and Company. (Referred to as MBE below).
Blakemore, S.-J. & Frith, U. (2005). *The Learning Brain: Lessons for Education*. Malden, MA: Blackwell Publishing. (Referred to as TLB below).

Readings will also include a collection of PDF files available via the Learn@UW system.

Mid-Term and Final Exams
This course will include two mid-term exams and one Final Exam. Each exam will be composed of a multiple choice section (worth 50% of your score), fill in the blanks (one word or phrase: 20% of your score) and several short answer questions (one paragraph each: 20% of your score), and one integrative essay of 1-2 pages (worth 10% of your score). You will need to choose one of two options for your essay answer.

Bi-weekly response papers
Once every two weeks, participants must complete a brief mini-paper (***max*** 3 pages). Because you only have three pages, it will be important to be succinct in your writing (i.e. jump right into your argument and avoid filler sentences like, "Philosophers have long wondered about the how experiences and ideas are stored…" With these papers, you may take one of several routes:

a) Discuss how the readings might impact thinking about your final project. This can include discussions of how the theory impacts your perspective and/or how it might influence the manipulations you use to examine your experimental question or instructional strategy.
b) Pitch a proposal for a follow-up study to one of the experiments we read about for class. Proposals should i) briefly state an experimental question and its motivation, ii) describe a proposed method, iii) discuss how potential data would be interpreted and potential implications

Final project
Students will have the choice of (1) designing a research study (and writing a research proposal) involving a topic within mind, brain and education, or (2) writing a 6-page paper integrating material from the class and from several outside readings. The purpose of the assignment is to go beyond what is discussed in class, possibly in a direction related to your own interests.

- Please send a one-page proposal of your final paper topic to the professor at the beginning of class Wednesday, April 10.
- A rough draft will be required to be turned in for feedback by Monday, April 29 at the beginning of class.
- The final draft will be due on Friday, May 10 at 5 pm.

It will not be appropriate to submit a paper or project that was written for another class. If you have specific questions regarding this, please discuss them with the professor.

Grading
This course will be graded on a standard A-F grading scale (A=93-100%, AB=88-92%, B=83-87%, BC=78 82%, C=70-77%, D=60-69%, F=0-59%). Your grade will be based on all facets of the course, with the following breakdown:

Generating Discussion Questions	10%
Mid-Term 1	20%
Mid-Term 2	20%
Final Project	20%
Final Exam	30%

Academic Honesty
Students are reminded that University policies on academic honesty will be strictly enforced in this class. Appropriate acknowledgment and references are expected in all written work for ideas and verbatim or paraphrased passages that are derived from the words or work of other individuals. Also, subjects in social scientific research have rights that must be protected. Students should become familiar with the rules of academic misconduct, and you should ask me if you are unsure what behaviors constitute academic misconduct in a specific class or assignment. For further information, see:
http://www.wisc.edu/students/saja/misconduct/misconduct.html

Special Accommodations
If you need any disability-related accommodations for instruction or assessments in this course, please let me as soon as possible so that I can make arrangements to facilitate your participation in the course. You can also contact the McBurney Disability Resource Center to learn about services available to students:
http://www.mcburney.wisc.edu

Readings/Timeline

I. Introducing Mind, Brain and Education
Wed 9/4: First Class
Instructor introduction; introduce students; discussion of research interests and motivation; syllabus review, brain basics.

Mon 9/9: Introducing Mind, Brain and Education 17 pages
MBE Preface, Introduction and Chapter 1 (pp. xvii-xxi and pp. 1-12).

Wed 9/11: Introducing The Learning Brain 17 pages
TLB Chapter 1 (pp. 1 – 17)

Mon 9/16: MBE Science Defined 24 pages
MBE Chapter 2 (pp. 13-37).

Wed 9/18: MBE: A New Look at Old Problems 35 pages
MBE Chapter 3 (pp. 38 – 73)

II. Neuromyths
Mon 9/23: Sorting the Science from the Myths 31 pages
MBE Chapter 4 (pp. 74-105).

Wed 9/25: The Developing Brain 23 pages
TLB Chapter 2 (pp. 18-36)
Goswami (2006) Neuroscience and education: from research to practice? *Nature Reviews Neuroscience* , 7(5):406-411.

III. Scientific Studies of Education
Mon 9/30: The Art of Teaching I 36 pages
MBE Chapter 5 (pp. 106-142)

Wed 10/2: The Art of Teaching II 33 pages
MBE Chapter 6 (pp. 143-176)

Mon 10/7: The Laboratory in the Classroom 27 pages
MBE Chapter 7 (pp. 177-204)

Wed 10/9: MID-TERM 1

IV. The Learning Brain: Math and Reading

Mon 10/14: Words and Numbers in Early Childhood I 15 pages

TLB Chapter 3 (pp. 37-52)

Wed 10/16: The Mathematical Brain I 26 pages

TLB Chapter 4 (pp. 53-66)

Ansari (2008) Effects of development and enculturation on number representation in the brain. *Nature Reviews Neuroscience*, 9, 278-291.

Mon 10/21: The Literate Brain I 13 pages

TLB Chapter 5 (pp. 67-80)

Wed 10/23: The Literate Brain II 18 pages

McCandliss et al., (2003) The Visual Word Form Area: Expertise for reading in the fusiform gyrus. *Trends in Cognitive Sciences*, 7(7):293-299.

Ben Schachar et al (2007) White matter pathways in reading. *Current Opinion in Neurobiology*, 17:258–270.

Mon 10/28: Learning to Read and its Difficulties I 20 pages

TLB Chapter 6 (pp. 81-93)

Gabrielli (2009) Dyslexia: a new synergy between education and cognitive neuroscience. *Science*, 325(5938):280-283.

Wed 10/30: Learning to Read and its Difficulties II 17 pages

Temple et al., (2003) Neural deficits in children with dyslexia ameliorated by behavioral remediation: Evidence from functional MRI. *Proceedings of the National Academy of Science*, 100(5):2860-2865.

Shaywitz et al., (2004) Development of left occipito-temporal systems for skilled reading in children after a phonologically-based intervention. *Biological Psychiatry*, 55(9):926-933.

Hoeft F. et al. (2011). Neural systems predicting long-term outcome in dyslexia. *Proceedings of the National Academy of Science*, 108(1):361-366.

V. The Learning Brain: Higher-Order Cognitive Functions

Mon 11/4: Executive Functions (Attention) 16 pages

Posner, M.I. & Rothbart, M. (2005) Influencing brain networks: implications for education. *Trends in Cognitive Sciences*, 9(3):99-103.

Rueda et al. (2005) Training, maturation, and genetic influences on the development of executive attention. *Proceedings of the National Academy of Science*, 102(41):14931-14936.

Tang, Y.-Y. & Posner, M.I. (2009) Attention training and attention state training. *Trends in Cognitive Sciences*, (5):222-227.

Wed 11/6: Executive functions (Working Memory)

Olesen et al. (2003) Increased prefrontal and parietal activity after training of working memory. *Nature Neuroscience*, 7(1):75-79.

Holmes et al., (2009) Adaptive training leads to sustained enhancement of poor working memory in children. *Developmental Science*, 12(4):F9-F15.

Mon 11/11: Disorders of Social Emotional Development
TLB Chapter 7 (pp. 94-110) 16 pages

Wed 11/13: The Adolescent Brain
TLB Chapter 8 (pp. 111-122) 12 pages

Mon 11/18: Mid-Term 2

VI. The Learning Brain: Learning, Remembering, and Individual Differences
Wed 11/20: Lifelong learning 15 pages
TLB Chapter 9 (pp. 123-138)

Mon 11/25: Learning and Remembering 11 pages
TLB Chapter 10 (pp. 139-150)

Wed 11/27: NO CLASS: THANKSGIVING

Mon 12/2: Different Ways of Learning 15 pages
TLB Chapter 11 (pp. 151-166)
Pashler et al., *Psych. Science in the Public Interest?*

VI. The Future of Mind, Brain and Education
Wed 12/4: Harnessing the Powers of the Brain 20 pages
TLB Chapter 12 (pp. 167-187)

Mon 12/9: Evidence-Based Solutions and Conclusions 29 pages
MBE Chapters 8 and 9 (205- 234)

Wed 12/11: Integration, review and future directions.
A discussion session in which the professor will present a bit about his prior and current works. This class will give you a chance to integrate all we've learned throughout the semester, review and to ask questions in advance of the final exam.

Classes End Friday, 12/13. **Final Project due 5 pm!**

SUNDAY 12/15 10:05 am – 12:05 pm Final Exam. Room TBA