# EDUC5390: COGNITIVE SCIENCE FOR BETTER LEARNING OUTCOMES

**By Dr. Helen Abadzi (habadzi@gmail.com, habadzi@uta.edu)**

## Rationale for the course

The US dept. of education is interested in preparing teachers to teach the weakest students. And in many parts of the world, some teachers tend to be weaker students also. They must be taught what they need for instruction simply and directly. Much is written in high-income countries about complex cognition, but the basics of information processing are often neglected.

Without knowledge of the basic components of cognition, policymakers and supervisors make judgments on the basis of their own perceptions about education. Such people tend to have well-educated families, and their children learn the basics very quickly. Therefore they may overestimate the learning trajectories of the very poor. Memory biases and fallacies about various educational methods, functions, prerequisites have been researched and are very common.

The course will focus on information processing functions that are relevant to instruction at the primary or secondary level: the declarative and implicit memory systems, with much emphasis on development of automaticity and complex skills. Overlap with neuroscience will be discussed. Topics will also include critical thinking, creativity, and executive functions. The course will conclude with cross-cultural psychology issues, including the cognitive commonalities and differences across cultures. Using learning research for policy formulation.

To function as users of scientific research, students must review the basic premises that permit critical evaluation of evidence: Basic experimental processes; hypothesis formation, operational definitions; effect size; credibility of authors. Teachers may have a limited opportunity to understand how to search the internet for valid research. Therefore the students of this course will learn to identify these and critically study their veracity. Also they will learn how to separate their own personal opinions and experiences from actual research. Furthermore, the benefits and limitations of translational research will be discussed.

## Objectives:

By the end of this course, students should be able to:

-Demonstrate use of essential cognitive psychology principles applicable to learning academic material under various circumstances

-Use cognitive research to explain and predict learning outcomes under various circumstances

-Given this body of research, critically evaluate statements made by educators, articles, reports, or the press

- Enhance their own students' learning by incorporating into instruction memory principles taught in this course.

**Class Activities**

- Lectures, presentation of topics and relevant research, illustrated by videos where possible.
- Reading and commenting on selected articles pertinent to various topics
- Application of some research findings during class
- Exercises to elaborate and increase recall
- Exams, testing on the material to promote long-term consolidation
- Contemplation and discussions on applicability in classes where students teach
- Critical study of various blogs and statements about educational topics; use of cognitive research in detecting biases; separating facts from opinions.

**Assignments**
-Homework will consist of various book sections and online write-ups about the topics covered in class; the powerpoint files and notes to be given by the professor.
- Research reviews and presentations on specific topics
- Discussions of articles, blogs related to topics discussed in class.

**Some Sources of Readings**

Benassi, V. A., Overson, C. E., & Hakala, C. M. (2014). Applying science of learning in education: Infusing psychological science into the curriculum. Retrieved from the Society for the Teaching of Psychology web site: http://teachpsych.org/ebooks/asle2014/index.php    (Online, no cost)

Reisberg, D.  2013. Cognition (5th ed.) Norton & Co. (available in the library)

Cozolino, L 2013. The Social Neuroscience of Education.  Norton & Co. (available in the library)

Baddeley, A. Eysenck, M., & Anderson, M. 2015. (2nd ed.)  Memory.  Psychology Press

Charness, N.  (2006). The influence of work and occupation on brain development.  In Baldes, P., Reuter-Lorenz, P. & Rosler, F. (Eds).  Lifespan Development and the Brain:  The Perspective of Biocultural Co-Constructivism. UK: Cambridge.

Ardila, A., & Keating, K. (2007).  Cognitive abilities in different cultural contexts.  In Uzzell, B., Pontón, M., & Ardila, A. (Eds) International Handbook of Cross-Cultural Neuropsychology. London:  Lawrence Erlbaum. (Two chapters, book available in the library)

Wikipedia, university and other scientific websites

**Tentative Syllabus**

The schedule of topics and activities is outlined below.  It will become better specified and may change according to student needs and new publications.

| Date | Topic | Class Activities | Assignments/Readings Due |
|---|---|---|---|
| July 12 | Learning research vs. international education policy | Presentation, discussion | Read 'Next step literacy' Write answers to questions |
| July 13 | Essential brain structures | Discussion Questions answered | Reisberg, p. 35-39, 47-52 Cozolino p. 142-146 |
| July 14 | Neuron operations and relevant lessons | Discuss assignments Presentation | Brain labeling exercise Reisberg, p. 52-53 |
| | | | |
| July 18 | Memory types – implications Emotional learning | Discuss assignments Presentation | Cell labeling exercise Read Anderson (2005) memory types |
| July 19 | Learning curves; working memory, chunking automaticity | Discuss assignments Presentation | Read Anderson-working memory Do Reisberg ch. 5 exercises |
| July 20 | Memory networks and categorization basics | Discuss assignments Presentation | Read Anderson ch. 7 Exercise |
| July 21 | Memory features that facilitate learning | Discuss assignments Presentation | Read Abadzi annex 2 Benassi et al. text overview |
| | | | |
| July 25 | Study skills research; review | Discuss assignments Presentation | Read article on study skills Exercise: innovation blog |
| July 26 | Reading for international education | Discuss assignments Presentation | Text: Literacy in 100 days Arabic reading (optional) |
| July 27 | Reading for international education (continued) | Discuss assignments Presentation | Mid-term exam |
| July 28 | Numeracy; problem solving, complex cognition | Discuss assignments Presentation | Read powerpoint on transcranial mag. stimulation |
| | | | |
| August 1 | Attention, Executive functions; boredom | Discuss assignments Presentation | look up terms in Wikipedia and Harvard website |
| August 2 | Motivation and emotion basics, curiosity | Discuss assignments Presentation | Read text Reisberg ch. 11 |
| August 3 | Cognitive and memory fallacies, critical thinking | Discuss assignments Presentation | Exercise Reisberg ch. 11 Study powerpoint file |
| August 4 | Teachers' cognition | Discuss assignments Presentation | Study powerpoint file Read creativity review by Abadzi et al., 2014 |
| | | | |
| August 8 | Creativity | Discuss assignments Presentation | |

| August 9 | Educating adults of all ages | Discuss assignments Presentation | Study powerpoint file Study Uzzel et al., Ardila & Keating chapters; WEIRD article |
|---|---|---|---|
| August 10 | Cross-cultural memory research | Discuss assignments Presentation | Study powerpoint file Prepare review questions |
| August 11 | Recapitulation | Discuss assignments Presentation | Review; prepare for exam |
| | | | |
| August 15 | | Final - feedback | Take test; apply to your work and life |

## Attendance

Students are expected to attend every class and to participate actively in discussions. If there is an emergency or unavoidable event, please let me know as soon as possible by e-mail. More than three absences will result in grade reduction.

## Course Grading

There will be a mid-term and a final exam. Each will count for 30% of grade. Research reviews, exercises, or presentations will count for 20% of the grade. Demonstrate ability to separate opinions from research.

The exams will be graded with a rubric. One point will be given for every correct statement students will make, given memory functions taught in the course. From a maximum number of points (to be announced and discussed), 90+% will earn an A, 80-89% will earn a B, 70-79% will earn a C, and below that there will be a D. The professor may change these percentages if student performance or other factors warrant so.

## Scheduling

The second summer session lasts from July 14-August 17. In order to optimize learning give the memory effects of distributive practice, the class will meet for two hours every Monday-Thursday. To accommodate working people it can meet 5:30-7:30 pm or another convenient time.

# POLICIES

**Late Work Policy**: Complete all assignments by the posting deadline noted.  Assignments turned in late will lose at least (if not more) 25% of the possible points for each class day/period after the assignment is due. No exceptions. Late means… via email after class, the next day or the next class period. Late work will be only accepted up until prior to the beginning of the next class period. If it is not in hard copy form or uploaded to Blackboard on the day it is due, it is considered late and will lose points. If turned in by the next class period it will lose 50% off total grade.

**Attendance Policy:** At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I expect you to participate in all required activities online, as stated in the syllabus. Your active participation in the course is expected.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

**Americans with Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

**Title IX:** The University of Texas at Arlington is committed to upholding U.S. Federal Law "Title IX" such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

**Student Support Services**: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall),

call the Maverick Resource Hotline at 817-272-6107, send a message to [resources@uta.edu](mailto:resources@uta.edu), or view the information at [www.uta.edu/resources](http://www.uta.edu/resources).

**Academic Integrity:** All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

*I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
*I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

Instructors may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

**Student Feedback Survey:** At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit [http://www.uta.edu/sfs](http://www.uta.edu/sfs).

**Final Review Week:** A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Using the Class Discussion Board:** Your instructor may post important information about this course on the Class Discussion Board. For this reason, you should check the Discussion Board frequently. The Class Discussion Board is also the forum for posting questions and answers about course content. In most cases, questions about course content should be posted publicly to the Class Discussion Board for the benefit of all students. Your instructor will try to respond to your questions as quickly as possible. If you need to discuss an issue with your instructor privately, you should do so by e-mail.

Commitment to Diversity: In our commitment to the furthering of knowledge and fulfilling our educational mission, the School of Education at the University of Texas at Arlington seeks a campus climate that welcomes, celebrates, and promotes respect for the entire variety of human experience.  In our commitment to diversity, we welcome people from all backgrounds.  We seek to include knowledge and values from many cultures in the curriculum.  Dimensions of diversity shall include, but are not limited to, the following: race, ethnicity, religious belief, sexual orientation, sex/gender, disability, socioeconomic status, cultural orientation, national origin, and age.

## COLLEGE OF EDUCATION MISSION AND CONCEPTUAL FRAMEWORK

**Institutional Mission**

The University of Texas at Arlington is a comprehensive research, teaching, and public service institution whose mission is the advancement of knowledge and the pursuit of excellence. The University is committed to the promotion of lifelong learning through its academic and continuing education programs and to the formation of good citizenship through its community service learning programs. The diverse student body shares a wide range of cultural values and the University community fosters unity of purpose and cultivates mutual respect.

**College of Education Mission**

The mission of the College of Education is to become a global leader of excellence in the educational sciences. The College promotes a collaborative culture of excellence in research, teaching, and service. It is committed to fostering critical, creative thinkers prepared to engage meaningfully in a dynamic society.

All activities in the College are guided by the premise that we are Partners for the Future, committed to fostering critical, creative thinkers prepared to engage meaningfully in a dynamic society. This premise is characterized and distinguished by three core values: Professionalism, Knowledge, and Leadership. Research, Diversity, and Technology are themes woven throughout each core value. The College mission, core values, and themes serve as the coherent thread running through all professional programs, guiding the systematic design and delivery of clinical/field experiences, course curricula, assessments, and evaluation.

### The University of Texas at Arlington College of Education

#### Professional Dispositions

**PROFESSIONAL DISPOSITIONS STATEMENT** *(Approved by Teacher Education Council, 2-7-2012). The following statement on Professional Dispositions will appear in the Undergraduate and Graduate Catalogs and in all relevant documentation.*

Each student/candidate in the College of Education and Health Professions of UT Arlington will be evaluated on Professional Dispositions by faculty and staff. These dispositions have been identified as essential for a highly-qualified professional. Instructors and program directors will work with students/candidates rated as "unacceptable" in one or more stated criteria. The student/candidate will have an opportunity to develop a plan to remediate any digressions.

**Demonstrates excellence**
- Meets stated expectations of student performance.
- Keeps timelines. Arrives on time for class and other activities.
- Produces significant artifacts of practitioner evidence.
- Possesses a willingness to set goals.
- Attends all classes/trainings and practicum experiences.
- Completes activities as assigned.
- Has appropriate personal appearance and/or hygiene for professional setting.

**Participates in a learner centered environment and shows respect for self and others**
- Uses appropriate and professional language and conduct.
- Supports a "high quality" learning environment.
- Shows respect and consideration for the thoughts and feelings of others.

**Research-based pedagogy**
- Has an awareness of and willingness to accept research-based concepts.
- Identifies important trends in education.
- Demonstrates interests in learning new ideas and strategies.
- Relates class discussions and issues to current events in education.

**Participates in on-going collaboration with peers and professionals**
- Demonstrates kindness, fairness, patience, dignity and respect in working with peers, staff and instructors.
- Works effectively with others.
- Assists others in the university classroom or practicum setting.
- Demonstrates an openness to assistance from others.
- Receives feedback in a positive manner and makes necessary adjustment.

**Exhibits stewardship of diversity**
- Shows appropriate stewardship and tolerance to diverse people, environments, and situations.

**Advocates use of technology**
- Uses and applies existing technologies sufficiently in work.
- Shows a willingness to use and apply emerging technologies in work.

**Shows interest in the learner and the learning-process**
- Demonstrates significant learning improvement over time.
- Shows interest in the learning process and demonstrates the necessary amount of time, energy, and enthusiasm for becoming better learners, teachers, and practitioners.