EPY 770	**COGNITION AND INSTRUCTION**		UNLV

Section :   1001
Meeting times: Thursdays 7:00-9:45pm
Meeting location: CEB 315A
Instructor: Matthew Bernacki, PhD, MSW

Office: CEB 311   **Phone:** (702) 895-4013   **E-mail:** matt.bernacki@unlv.edu
Office Hours: Thursdays 4:00-6:00, and by appointment (Email to arrange face-to-face/phone/virtual).

UNLV Catalog Course Description

Examines research in the application of cognitive learning principals to instruction in specific domains, particularly reading, writing, mathematics, and science. Research on technological applications especially emphasized. Readings include both foundational and current research.

Full Course Description

This course examines research on the application of cognitive learning principles to instruction in specific content domains, particularly reading, writing, mathematics, and science. We will begin the course with an overview of the cognitive, learning and educational sciences and discuss cognitive processes known to facilitate learning across domains. We will then explore the cognitive tasks involved in domain learning, and the design of standards to evaluate students' learning in a domain. Over the remainder of the semester, we will take a disciplinary approach to examining linkages between cognitive theory and research, standards for instruction, and instructional practices and technologies.

The course is designed to expose students to theory and both classic and current research on cognitive principles, with an eye towards understanding their incorporation into disciplinary standards for instruction, and as they guide the design and implementation of instructional practices, technologies and curriculum. The practical goals of the course are two fold:

1. The coursework should facilitate the development of ideas that can lead to dissertation, thesis, and independent study proposals.
2. A secondary goal is to introduce students to the learning sciences and to cognitive principles underlying the design of powerful learning environments so that they might become more savvy consumers of instructional technologies, and more informed contributors to discussions on the design of educational systems.

Although the course is designed for individuals preparing to teach or do research in educational psychology, educational technology, or curriculum & instruction, the course may also be of interest to practitioners seeking knowledge of research-based innovations in the content domains.

Course Objectives

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

Knowledge
1. Identify specific cognitive principles and their utility for acquiring certain varieties of knowledge.
2. Discuss the relevance of a cognitive process in a specific domain.
3. Discuss the mechanisms by which people acquire knowledge and provide empirical evidence to support their claims.
4. Discuss research that demonstrates how cognitive science principles can guide the design of instructional practices.
5. Critically analyze content standards and instructional objectives to identify the level of understanding they target and the types of instructional practices likely to support students in satisfying an objective.
6. Critique the design of an instructional practice or technology, and provide empirically supported recommendations that derive from cognitive, educational or learning sciences research. These concepts include production rules, schemas, knowledge building, knowledge integration, mental and computer-based simulations; cognitive load, elaboration, and central conceptual structures; and metacognition.

Skills

7. Demonstrate the ability to analyze and appraise the features of a research study, including the theoretical perspective, research questions, hypotheses, methods, analytical approach, results and implications for theory and practice.

Dispositions

8. Appreciate the value of an empirically-grounded approach to the design, evaluation and implementation of instructional approaches and technologies.

Overall objective

As a result of taking this course, students will become more aware of research-validated instructional innovations. By understanding the theoretical principles underlying these innovations, they will also become better able to evaluate (and improve upon) other educational innovations that they may encounter, and to select appropriate curriculum materials (including computer-based programs).

Texts, readings, and instructional resources

Required Text

There is no required text for this course. Instead, students will be directed to a set of book chapters, articles, and publications that can be downloaded or accessed via the course site on the WebCampus (Blackboard Learn) learning management system.

Instructional Procedures

The course will operate as a seminar; students will be expected to acquire a working knowledge of approximately two to three assigned readings per week. Sessions will include a brief period of exposition, followed by a scaffolded discussion prompting summarization and critique of the prepared materials. Students will be expected to contribute to all course discussions and to lead segments of discussion periodically.

The course will proceed in a lagged, two-component manner:

1. Each week, the instructor will present the session topic(s) from the syllabus. Students will arrive having read the corresponding materials, typically including a theoretical or policy piece and a seminal empirical study or two. Exposition and discussion of these readings and related activities will comprise the bulk of each session. . At the end of each session, students who are interested in the topic will volunteer to present the following week. Two students can volunteer to seek out a contemporary piece of research on the topic from a major peer-reviewed publication published in the past three years.

2. In the week that follows, the students will present a synopsis and critique of a contemporary research article on the *first* week's topic. Upon reviewing the article, the student will email the instructor to indicate their selection. Once approved, the student should prepare a presentation described in the **Article Summary, Critique, & Proposal** section below.

Assignments, evaluation procedures, and grading policy

Student learning will be assessed via two methods:

1. **Article Summary, Critique & Proposal.**
   Students will complete THREE reviews of empirical work over the course of the semester. At the end of Week 2, students will select a cognitive principle and explore its implementation in an instructional practice or technology and share what they have learned in Week 3. On two more occasions during the semester, each student will select a cognitive principle as it applies to a domain and conduct a similar reading, analysis and presentation. For each topic selected, students should prepare:

   a. A 250-word **summary** of the article's theoretical grounding, central question, data sources and methodology, findings, and major implications (for theory and research)

b. A 250-word **critique** of the study's conceptualization, methodology, analytical approach, and interpretation of findings.
c. A 250-word **proposal** of a follow up study that could further extend this contemporary work.

**** These should be sent as a 3-page document to the instructor by 4pm on the day of the presentation *****
**** so a handout can be shared with colleagues (1-page double sided summary + critique; no proposal) *****

d. A 10- to 15-minute visual presentation that facilitates discussion of the summary, critique, and proposed extension.
    i. Be sure to include a set of guiding questions to facilitate class discussion about the cognitive process under investigation and the way it was undertaken in the study.

2. **A cognitive task analysis of a set of academic standards and proposal for instruction.**
   As national standards for domains are adopted directly or modified by states, many educational professionals have become deeply engaged in determining how to design instruction that aligns to standards and helps students to achieve the knowledge and understanding they prescribe. In this class, we will undertake this activity from a cognitive science perspective and develop a proposal for implementing instructional practices and adopting instructional technologies that support student learning.

   More details about this assignment will be provided in the middle of the semester, but students should expect to
   a. Identify a domain of study and a grade level whose standards they wish to analyze
   b. Conduct a cognitive task analysis using the standards and exemplars of curriculum used to teach to these standards
   c. Compose a brief report outlining the cognitive tasks students must successfully complete in order to satisfy the standards
   d. Propose an instructional plan that incorporates instructional practices and technologies to help students meet the standards.

Credit will be awarded for the following products (Due)	Points
Cognitive Science Symposium Summary/Critique/Proposal (week 3)	20
Topical Summary/Critique/Proposal #1 (student-selected week 4-13)	20
Topical Summary/Critique/Proposal #2 (student-selected week 4-13)	20
Cognitive Task Analysis of a set of standards (Week 13)	20
Instructional Design Plan (Week 15)	20

Attendance
Students are expected to attend class. Missing a class will not result in a grade deduction, however, in-class work is common. **In-class work <u>cannot</u> be made up** and those who are unexcused will receive a grade of 0 on in-class work assigned on days they miss. If you know you will miss a session, alert the instructor *prior* to the session so arrangements can be made. If you miss an extended period of coursework, you must address this prior to exam week to avoid receiving a failing grade for the course.

Grading
Scale to determine one's letter grade. Decimals will be rounded to the nearest whole number.

A	100-94%		C	76-73%
A-	93-90%		C-	72-70%
B+	89-87%		D+	69-65%
B-	82-80%		D	64-60
C+	79-77%			

F   59% and below and for any violation of academic honesty policy

University policies can be found at: http://www.unlv.edu/provost/policies-forms

Weekly Schedule

Week	Topic and Assigned Readings (to be completed prior class that week)
1 8/27	*An introduction to the cognitive underpinnings of learning in domains* • Models of Domain Learning • Cognitive Task Analysis • Bloom's Taxonomy and the design of standards & objectives
2 9/3	*An introduction to the Cognitive, Learning and Educational Sciences* • A sprint through cognitive science principles • "Deep" versus "shallow" cognitive processing
3 9/10	*Applied Cognitive Science Principles Symposium*
4 9/17	MATH • Common Core Math Standards
5 9/24	MATH • Problem solving
6 10/1	MATH • Mathematical Reasoning
7 10/8	SCIENCE • Next Generation Science Standards
8 10/15	SCIENCE • Scientific Reasoning
9 10/22	SCIENCE • Conceptual Change
10 10/29	LANGUAGE & LITERACY: Reading Comprehension • Common Core Standards for Literacy (part 1)
11 11/5	LANGUAGE & LITERACY: Writing • Common Core Standards for Literacy (part 2)
12 11/12	LANGUAGE & LITERACY: Language Acquisition (including L2) • Common Core Standards for Literacy (part 3)
13 11/19	Cognitive Science Redux & Workshop Day
X 11/26	*** THANKSGIVING BREAK *** No class. Prepare your presentations
14 12/3	Presentations
15 12/10	Presentations

UNLV Policies

liability, as well as disciplinary action under University policies. Additional information can be found at: http://www.unlv.edu/provost/copyright.

Disability Resource Center (DRC)—The UNLV Disability Resource Center (SSC-A 143, http://drc.unlv.edu/, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Final Examinations—The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: http://www.unlv.edu/registrar/calendars.

Incomplete Grades—The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Library Resources—Students may consult with a librarian on research needs. Subject librarians for various classes can be found here: https://www.library.unlv.edu/contact/librarians_by_subject. UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at https://www.library.unlv.edu/.

Rebelmail—By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

Religious Holidays Policy—Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: http://catalog.unlv.edu/content.php?catoid=6&navoid=531.

Transparency in Learning and Teaching—The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:
https://www.unlv.edu/provost/teachingandlearning

https://www.unlv.edu/provost/transparency

Tutoring and Coaching—The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit http://www.unlv.edu/asc or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of SSC **A** (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TBE second floor.

UNLV Writing Center—One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The

student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: http://writingcenter.unlv.edu/.