



PSY 625.01W – Cognition and Instruction I

COURSE SYLLABUS: Fall 2026 (Online)

INSTRUCTOR INFORMATION

Instructor: Shifang Tang, Ph.D.

Office Location: Henderson 202A

Office Hours: Weekly virtual office hours will be posted in D2L; in-person or Zoom meetings are available by appointment.

Email Address: shifang.tang@etamu.edu

Preferred Form of Communication: Email; please allow up to two business days for a response.

COURSE INFORMATION

Course Format: Asynchronous online supported by D2L

Semester Dates: August 20, 2026–December 11, 2026.

Weekly Rhythm: The weekly academic cycle normally runs Monday through Sunday. Course modules are made available in advance. Students select 10 of the 16 weekly topics for graded participation. For each selected topic, both the discussion and the brief application are due Sunday at 11:59 p.m. Central Time unless otherwise stated. Required project milestones follow the dates in the course calendar.

Materials – Textbooks, Readings, and Supplementary Resources

Classic and contemporary journal articles and selected book chapters are listed in the weekly schedule and will be linked or posted in D2L. No single textbook covers all course content; students are responsible for completing all assigned readings.

Course Description

PSY 625 examines the psychological principles and scientific knowledge base underlying major theories of cognition, learning, and instructional design. The course emphasizes how cognitive and learning-science theories inform the design, analysis, evaluation, and improvement of instruction across educational settings. The sequence moves cumulatively from foundations and instructional design to cognitive architecture, multimedia and generative learning, knowledge and memory, metacognition and transfer, executive functioning, grounded cognition, reading comprehension, motivation and STEM persistence, culture and learner variability, learning-environment design, and evidence-based evaluation of instructional claims.

Course Objectives

1. Develop a coherent understanding of major cognitive and learning-science theories relevant to instruction.
2. Examine how learner characteristics, task demands, representations, context, and assessment interact to influence learning.
3. Critically evaluate empirical claims about instructional models, educational technologies, and learning interventions.
4. Apply cognitive principles to the design, revision, and evaluation of instruction in classroom, online, and technology-supported settings.
5. Prepare students to synthesize theories and evidence in original, comprehensive-examination-style scholarly arguments.

Student Learning Outcomes

1. Explain and compare major instructional-design models, including their assumptions, components, purposes, learner and instructor roles, strengths, and limitations.
2. Explain cognitive principles relevant to instruction, including attention, working memory, cognitive load, executive functioning, knowledge organization, expertise, memory, transfer, metacognition, and self-regulation.
3. Apply multimedia-learning, generative-learning, grounded-cognition, and perceptual-learning principles to the design and critique of instructional materials and educational technologies.
4. Analyze how reader characteristics, learning tasks, text characteristics, motivation, culture, language, identity, accessibility, and institutional conditions shape learning.
5. Critically evaluate empirical evidence concerning executive-function training, learning styles, flipped learning, STEM persistence, educational technologies, and other instructional claims.
6. Design learning environments and assessments that promote durable learning, appropriate study regulation, preparation for future learning, and near and far transfer.
7. Develop and communicate an evidence-based instructional redesign or research proposal through scholarly discussion, written analysis, collaboration, presentation, and an integrative final examination.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

- Use D2L/myLeo Online to access modules, participate in discussions, submit assignments, and review feedback.
- Create and submit documents in Microsoft Word or PDF format and use presentation software such as PowerPoint or Google Slides.
- Participate in Zoom meetings when required and use shared documents or collaborative tools for the group project.
- Maintain reliable internet access and a backup plan for technology problems.

Instructional Methods and D2L Module Organization

This is an asynchronous online course. Instruction includes assigned readings, instructor-developed notes or brief lectures, structured discussion, concise application activities, peer feedback, collaborative project work, and an integrative final examination.

Each weekly D2L module will normally contain the following items in order:

1. Week overview, learning objectives, and guiding question
2. Required readings and optional resources
3. Instructor notes, slides, or recorded explanation
4. Weekly reading discussion
5. Brief weekly application prompt and, when scheduled, a required major-project milestone
6. Module summary, reminders, and preparation for the next week

All 16 modules include a guiding question, a discussion prompt, and a brief application prompt. Students choose 10 topics and submit both the discussion and application for those selected topics. Required project checkpoints and the individual learning analysis remain separate course requirements. Students preparing for the Cognition and Instruction comprehensive examination are strongly encouraged to outline or practice responses for all 16 topics, even though only 10 topic sets are submitted for grading.

Student Responsibilities and Tips for Success

Read actively: Complete the readings before beginning the discussion and application. Take notes on each author's central claims, evidence, limitations, and instructional implications.

Engage consistently: Check D2L and university email frequently. Online participation is essential because discussions and peer feedback constitute part of the seminar experience.

Write analytically: Move beyond summary. Define the relevant theory, evaluate evidence, compare perspectives when appropriate, and apply ideas to an instructional or research problem.

Ask questions early: Contact the instructor when directions, readings, or course concepts are unclear. Do not wait until a deadline has passed.

Use retrieval and spacing: Review notes across the semester rather than studying only near the final examination. Practice outlining responses that integrate multiple readings and modules.

Protect your work: Save backup copies of drafts and collaborative documents. Technology difficulties do not automatically excuse late work.

GRADING

Final grades in this course will be based on the following scale:

A	B	C	D	F
90–100%	80–89%	70–79%	60–69%	Below 60%

Assessments and Weights

Assessment	Weight	Description
Selected weekly reading discussions (10 of 16)	20%	Students complete 10 topic discussions. Each original post is approximately 200–300 words, connects the assigned readings to the guiding question, and includes substantive engagement with classmates.
Selected cognition-to-instruction applications (10 of 16)	20%	For the same 10 selected topics, students submit a concise application of approximately 150 words. Formats may include a brief scenario analysis, comparison, audit, redesign rationale, or evidence-based recommendation.
Individual learning analysis	10%	A 3–4 page analysis of a new or unfamiliar learning experience using course concepts introduced through Week 9.
Group research-to-instruction project	25%	An evidence-based instructional redesign or mini research proposal developed through sequenced checkpoints.
Group presentation	10%	A scholarly presentation of the group project, including theory, evidence, design, evaluation, limitations, and implications.
Final take-home examination	15%	Integrative essays modeled on historical comprehensive-examination content but using original prompts and scenarios.

Assignment Expectations

Weekly reading discussions: Students select 10 of the 16 weekly topics. For each selected topic, the original discussion post should be approximately 200–300 words, respond directly to the guiding question, and use the assigned readings to explain, critique, compare, or apply the week's ideas. Students should also make at least one substantive reply to a classmate. The same 10 topics should normally be used for the discussion and application. Each selected discussion must be completed within its assigned weekly module; students may not wait until the end of the semester to submit earlier discussions.

Weekly application assignments: For each of the same 10 selected topics, students submit a brief application of approximately 150 words within the corresponding D2L module. The application is not a

second essay. It should use the current theory to analyze a focused scenario, identify a problem, make a concise recommendation, or justify a small instructional decision. A short table, checklist, or other structured response may accompany the 150-word rationale when appropriate. Students are encouraged to practice the application prompts for all 16 topics as preparation for the comprehensive examination, although only 10 are submitted for grading.

Individual learning analysis: Students will document how they attempted to learn something new and interpret the experience using attention or cognitive load, knowledge and practice, memory, metacognitive regulation, and transfer. The paper should be approximately 3–4 pages, excluding references.

Group research-to-instruction project: Groups will develop either an instructional redesign or a mini research proposal. The final product must identify a learning problem, analyze learner and task characteristics, review relevant evidence, justify design or research decisions, explain how outcomes and transfer would be evaluated, and acknowledge limitations and implementation constraints.

Group presentation: Presentations may be synchronous or recorded, depending on class needs. Each presentation should communicate the learning problem, theory, evidence base, proposed design or study, expected outcomes, evaluation plan, limitations, and implications.

Final take-home examination: The examination will contain integrative essay questions requiring synthesis across multiple modules. Students will compare theories, critique empirical evidence, and apply cognition-and-instruction principles to instructional or research problems. The prompt will be released at least two weeks before the due date.

Group Project Checkpoints

Checkpoint	Due Date	Purpose
Team and topic forum	September 27, 2026	Identify the instructional or research problem and proposed group roles.
Project proposal	October 11, 2026	Present the problem, target learners, theoretical direction, and preliminary plan.
Evidence map / annotated source plan	November 1, 2026	Organize the central theories and empirical evidence supporting the project.
Draft or design prototype	November 15, 2026	Submit a substantial draft, prototype, or research-design plan for feedback.
Group presentation	December 6, 2026	Present the project and respond to questions and feedback.
Final project paper/package	December 11, 2026	Submit the revised final product and any required appendices or materials.

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by East Texas A&M have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

Zoom Video Conferencing Tool

https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@etamu.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, an East Texas A&M campus open computer lab, etc.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Interaction with Instructor Statement

Because this is an asynchronous online course, I strongly encourage you to use the virtual office hours posted in D2L for individual questions, clarification, or guidance. In-person or Zoom meetings are also available by appointment. Email is the best way to contact me. On weekdays, please allow up to two business days for a response. If you do not receive a reply within two business days, please kindly resend your message.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

Plagiarism: East Texas A&M University views plagiarism as a serious offense. Plagiarism occurs when individuals take ideas and/or words from another source and claim these ideas as their own without giving credit to the original author(s). This can include copying words from an Internet website, reading an article and taking the authors ideas without giving them credit, or writing work that is remarkably similar to other written work (e.g., Changing words to synonyms is still plagiarism). If any written work contains ideas that are not your own, you need to give credit to the author(s) by including citations. Instructors are obligated to report instances of plagiarism to university officials. Please refer to the American Psychology Association (APA) manual for instructions on citing materials. When in doubt, ask me. Acts of plagiarism on any written assignment, including discussion postings, will result in severe

consequences, including the possibility of receiving a zero in the course. Acts of plagiarism will be reported to the department head.

Writing Assignments: Formal written work, including the individual learning analysis, group project, and final examination, should follow APA Style (7th ed.) as appropriate. Weekly discussions and brief applications should include clear attribution and citations to assigned sources but do not require a title page unless otherwise stated in D2L. Basic APA guidance is available through Purdue OWL or the Learning Center located on the main floor of the library.

Late work: Selected weekly discussions and applications must be completed by the deadline for the module in which they appear. Because students may choose 10 of 16 topics, a missed weekly topic should ordinarily be replaced by selecting another topic rather than submitted late. Required project milestones, the individual learning analysis, presentation, and final examination are expected on time. Unless prior arrangements have been made, work submitted within 24 hours after a required major-assignment deadline may receive a 10% deduction; submissions more than 48 hours late may not be accepted.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct can be found at <https://www.tamuc.edu/student-code-of-conduct/>.

If you believe someone has engaged in behaviors that do not align with the Code of Student Conduct or you have other concerns, please visit the File a Report page at <https://www.tamuc.edu/office-of-student-rights-and-responsibilities/concerns-incident-reporting/>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: <https://www.britannica.com/topic/netiquette>

Academic Integrity

Students at East Texas A&M are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate student academic dishonesty policy
[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

Undergraduate student academic dishonesty policy
[Undergraduate Student Academic Dishonesty Form](#)

Graduate student academic dishonesty policy:

<https://inside.tamuc.edu/aboutus/policiesproceduresstandardsstatements/rulesProcedures/13students/graduate/13.99.99.R0.10.pdf>

Graduate student academic dishonesty form:

<https://inside.tamuc.edu/academics/graduateSchool/faculty/GraduateStudentAcademicDishonestyForm.pdf>

East Texas A&M Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage.

Artificial Intelligence

East Texas A&M acknowledges that there are legitimate uses of Artificial Intelligence, Chatbots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Services

Velma K. Waters Library- Room 162

Phone (903) 886-5930

Fax (903) 468-8148

Email: StudentDisabilityServices@etamu.edu

Website: <http://inside.tamuc.edu/campuslife/campusServices/StudentDisabilityServices/default.aspx>

Mental Health and Well-Being

The university aims to provide students with essential knowledge and tools to understand and support mental health. As part of our commitment to your well-being, we offer access to Telus Health, a service available 24/7/365 via chat, phone, or webinar. Scan the QR code to download the app and explore the resources available to you for guidance and support whenever you need it.



East Texas A&M Supports Students' Mental Health

The Counseling Center at East Texas A&M, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

Nondiscrimination Notice

East Texas A&M will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in East Texas A&M buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and East Texas A&M Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all East Texas A&M campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

COURSE OUTLINE / CALENDAR

The calendar is organized around a Monday–Sunday academic cycle after the opening partial week. Each of the 16 topic modules contains a discussion and a brief application prompt. Students submit 10 complete topic sets for grading; a complete set includes both the discussion and the application. Required project milestones and major assignments remain due on the dates shown below. Detailed directions, readings, and submission links will appear within each D2L module. Due dates are Central Time.

Week	Dates	Topic	Weekly Work and Required Milestones
1	Aug. 20–23	Foundations of Cognition, Learning, and Evidence	If selected: discussion + brief application due Aug. 23.
2	Aug. 24–30	Instructional-Design Models	If selected: discussion + brief application due Aug. 30.
3	Aug. 31–Sept. 6	Attention, Working Memory, and Cognitive Load	If selected: discussion + brief application due Sept. 6.
4	Sept. 7–13	Multimedia Learning, PowerPoint, Video, and Animation	If selected: discussion + brief application due Sept. 13.
5	Sept. 14–20	Generative Learning, Cognitive Engagement, and Edutainment	If selected: discussion + brief application due Sept. 20.
6	Sept. 21–27	Knowledge Organization, Schema, and Expertise	If selected: discussion + brief application due Sept. 27. Required team/topic forum also due Sept. 27.
7	Sept. 28–Oct. 4	Memory, Retrieval, Spacing, and Assessment	If selected: discussion + brief application due Oct. 4.
8	Oct. 5–11	Metacognition, Calibration, and Self-Regulated Learning	If selected: discussion + brief application due Oct. 11. Required group project proposal also due Oct. 11.
9	Oct. 12–18	Transfer, Problem Solving, Flipped Learning, and Preparation for Future Learning	If selected: discussion + brief application due Oct. 18. Required individual learning analysis also due Oct. 18.

Week	Dates	Topic	Weekly Work and Required Milestones
10	Oct. 19–25	Executive Functioning and EF Training	If selected: discussion + brief application due Oct. 25.
11	Oct. 26–Nov. 1	Grounded Cognition, Perceptual Learning, and Abstraction	If selected: discussion + brief application due Nov. 1. Required group evidence map also due Nov. 1.
12	Nov. 2–8	Reading Comprehension: Reader, Task, and Text	If selected: discussion + brief application due Nov. 8.
13	Nov. 9–15	Motivation, Interest, Grit, and STEM Persistence	If selected: discussion + brief application due Nov. 15. Required project draft/design prototype also due Nov. 15.
14	Nov. 16–22	Culture, Language, Equity, Learner Variability, and Learning Styles	If selected: discussion + brief application due Nov. 22.
15	Nov. 23–29	Learner-, Knowledge-, Assessment-, and Community-Centered Environments	If selected: discussion + brief application due Nov. 29. Optional exam outline/project update also due Nov. 29.
16	Nov. 30–Dec. 6	Instructional Evaluation, AI, and Course Synthesis	If selected: discussion + brief application due Dec. 6. Required group presentation also due Dec. 6.
Finals	Dec. 7–11	Final synthesis and submission period	Final group project and take-home examination due Dec. 11

DETAILED WEEKLY READING AND ACTIVITY SCHEDULE

The guiding questions and application prompts below are original course prompts aligned with the theoretical domains of the Cognition and Instruction comprehensive examination. Students select 10 of the 16 topics and, for each selected topic, submit a 200–300-word discussion and an approximately 150-word application. Students who expect to take the comprehensive examination are strongly encouraged to outline or practice all 16 topics. Readings may be adjusted if access, edition, or copyright limitations require an equivalent source.

Week 1: August 20–23 – Foundations of Cognition, Learning, and Evidence

Guiding question: What distinguishes learning from short-term performance, and how should cognitive theory and empirical evidence guide instructional questions?

Required readings:

- National Academies of Sciences, Engineering, and Medicine. (2018). How people learn II: Learners, contexts, and cultures. Introduction and selected chapter on learning processes.
- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., Norman, M. K., & Mayer, R. E. (2010). How learning works: Seven research-based principles for smart teaching (Vol. 1). San Francisco, CA: Jossey-bass.
- Newell, A. (1973). You cannot play 20 questions with nature and win. In W. G. Chase (Ed.), Visual information processing (pp. 283–308). Academic Press.

Brief application prompt: Given a brief course scenario, classify the available indicators as engagement, immediate performance, retention, or meaningful learning, and recommend one additional measure needed before an instructional decision is made.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, August 23.

Week 2: August 24–30 – Instructional-Design Models

Guiding question: How do established instructional-design models translate theories of learning into systematic and revisable instructional decisions?

Required readings:

- Gagne, R. M., Wager, W. W., Golas, K. C., & Keller, J. M. (2005). Principles of instructional design (5th ed.). Selected chapters.
- Molenda, M. (2015). In search of the elusive ADDIE model. *Performance Improvement*, 54(2), 40–42.
- Tripp, S. D., & Bichelmeyer, B. (1990). Rapid prototyping: An alternative instructional design strategy. *Educational Technology Research and Development*, 38(1), 31–44.

Brief application prompt: Choose two instructional-design models for a specified instructional problem. Identify two consequential differences and recommend the better-fitting model with a brief justification.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, August 30.

Week 3: August 31–September 6 – Attention, Working Memory, and Cognitive Load

Guiding question: How do attention and working-memory limitations constrain instructional design, and how can cognitive load be measured?

Required readings:

- Sweller, J., van Merriënboer, J. J. G., & Paas, F. G. W. C. (1998). Cognitive architecture and instructional design. *Educational Psychology Review*, 10, 251–296.
- Paas, F., Tuovinen, J. E., Tabbers, H., & Van Gerven, P. W. M. (2003). Cognitive load measurement as a means to advance cognitive load theory. *Educational Psychologist*, 38(1), 63–71.
- Sweller, J. (2010). Element interactivity and intrinsic, extraneous, and germane cognitive load. *Educational Psychology Review*, 22, 123–138.

Brief application prompt: Identify two possible cognitive-load problems in an instructional material, propose one focused revision, and name one feasible way to evaluate whether the revision helped.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, September 6.

Week 4: September 7–13 – Multimedia Learning, PowerPoint, Video, and Animation

Guiding question: How can multimedia design manage cognitive processing while supporting the selection, organization, and integration of information?

Required readings:

Mayer, R. E. (2024). The past, present, and future of the cognitive theory of multimedia learning. *Educational Psychology Review*, 36, Article 8.

Hoffler, T. N., & Leutner, D. (2007). Instructional animation versus static pictures: A meta-analysis. *Learning and Instruction*, 17(6), 722–738.

Brief application prompt: Examine one video, slide, or animation. Identify one multimedia-design strength and one weakness, then propose one evidence-based revision.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, September 13.

Week 5: September 14–20 – Generative Learning, Cognitive Engagement, and Edutainment

Guiding question: What makes a learning activity cognitively generative rather than merely active, attractive, or entertaining?

Required readings:

Fiorella, L., & Mayer, R. E. (2016). Eight ways to promote generative learning. *Educational Psychology Review*, 28(4), 717–741.

Chi, M. T. H., & Wylie, R. (2014). The ICAP framework: Linking cognitive engagement to active learning outcomes. *Educational Psychologist*, 49(4), 219–243.

Harp, S. F., & Mayer, R. E. (1998). How seductive details do their damage: A theory of cognitive interest in science learning. *Journal of Educational Psychology*, 90(3), 414–434.

Brief application prompt: Classify an instructional activity using the ICAP framework and explain one change that would make the activity more cognitively generative rather than merely attractive or active.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, September 20.

Week 6: September 21–27 – Knowledge Organization, Schema, and Expertise

Guiding question: How do experts organize knowledge differently from novices, and what instructional experiences support adaptive expertise?

Required readings:

Alexander, P. A. (2003). The development of expertise: The journey from acclimation to proficiency. *Educational Researcher*, 32(8), 10–14.

Macnamara, B. N., Hambrick, D. Z., & Oswald, F. L. (2014). Deliberate practice and performance: A meta-analysis. *Psychological Science*, 25(8), 1608–1618.

Brief application prompt: Identify one important difference between how a novice and an expert approach a disciplinary task, then recommend one scaffold that could help the novice develop better-organized knowledge.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, September 27. The required group team/topic forum is also due September 27.

Week 7: September 28–October 4 – Memory, Retrieval, Spacing, and Assessment

Guiding question: How can assessment and practice be designed to promote durable learning rather than short-term performance?

Required readings:

Roediger, H. L., & Karpicke, J. D. (2006). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science*, 1(3), 181–210.

Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques. *Psychological Science in the Public Interest*, 14(1), 4–58.

Cepeda, N. J., Pashler, H., Vul, E., Wixted, J. T., & Rohrer, D. (2006). Distributed practice in verbal recall tasks: A review and quantitative synthesis. *Psychological Bulletin*, 132(3), 354–380.

Brief application prompt: Create a brief one-week learning plan that combines retrieval practice and spacing. Explain why the sequence should support more durable learning than rereading or massed practice.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, October 4.

Week 8: October 5–11 – Metacognition, Calibration, and Self-Regulated Learning

Guiding question: What differentiates effective from ineffective learners in how they plan, monitor, regulate, and evaluate learning?

Required readings:

- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice*, 41(2), 64–70.
- Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16(4), 385–407.
- Bjork, R. A., Dunlosky, J., & Kornell, N. (2013). Self-regulated learning: Beliefs, techniques, and illusions. *Annual Review of Psychology*, 64, 417–444.

Brief application prompt: Identify one likely metacognitive or calibration error in a learner scenario and propose one practical scaffold for improving monitoring, strategy choice, or allocation of study time.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, October 11. The required group project proposal is also due October 11.

Week 9: October 12–18 – Transfer, Problem Solving, Flipped Learning, and Preparation for Future Learning

Guiding question: Why is transfer difficult, and how can instruction prepare learners to use knowledge in unfamiliar situations and across domains?

Required readings:

- Bransford, J. D., & Schwartz, D. L. (1999). Rethinking transfer: A simple proposal with multiple implications. *Review of Research in Education*, 24, 61–100.
- Kapur, M. (2016). Examining productive failure, productive success, unproductive failure, and unproductive success in learning. *Educational Psychologist*, 51(2), 289–299.

Brief application prompt: Modify one element of a flipped-classroom activity to promote preparation for future learning, and identify one outcome that would provide evidence of transfer.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, October 18. The required individual learning analysis is also due October 18.

Week 10: October 19–25 – Executive Functioning and EF Training

Guiding question: What are the benefits and limitations of executive-function training, and what evidence is needed to establish transfer beyond trained tasks?

Required readings:

- Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64, 135–168.
- Melby-Lervag, M., Redick, T. S., & Hulme, C. (2016). Working memory training does not improve performance on measures of intelligence or other measures of far transfer. *Perspectives on Psychological Science*, 11(4), 512–534.
- Diamond, A., & Ling, D. S. (2016). Conclusions about interventions, programs, and approaches for improving executive functions. *Developmental Cognitive Neuroscience*, 18, 34–48.

Brief application prompt: For a proposed executive-function intervention, identify the EF component being trained, one plausible near-transfer outcome, one far-transfer claim, and one methodological concern.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, October 25.

Week 11: October 26–November 1 – Grounded Cognition, Perceptual Learning, and Abstraction

Guiding question: Why are grounded and embodied accounts important alternatives to classical views of cognition, and how can perceptual grounding support abstract thinking?

Required readings:

- Barsalou, L. W. (2008). Grounded cognition. *Annual Review of Psychology*, 59, 617–645.
- Goldstone, R. L., Landy, D. H., & Son, J. Y. (2010). The education of perception. *Topics in Cognitive Science*, 2(2), 265–284.
- Koedinger, K. R., Alibali, M. W., & Nathan, M. J. (2008). Trade-offs between grounded and abstract representations: Evidence from algebra problem solving. *Cognitive Science*, 32(2), 366–397.

Brief application prompt: Select one abstract concept and add one perceptual or embodied support. Explain how the support could aid understanding and when it should be reduced or faded.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, November 1. The required group evidence map is also due November 1.

Week 12: November 2–8 – Reading Comprehension: Reader, Task, and Text

Guiding question: How do reader characteristics, reading purposes and tasks, and text characteristics interact to determine comprehension?

Required readings:

Kintsch, W. (1986). Learning from text. *Cognition and Instruction*, 3(2), 87–108.

Castles, A., Rastle, K., & Nation, K. (2018). Ending the reading wars: Reading acquisition from novice to expert. *Psychological Science in the Public Interest*, 19(1), 5–51.

Brief application prompt: Identify one reader characteristic, one task demand, and one text feature that could hinder comprehension, then recommend one aligned instructional support.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, November 8.

Week 13: November 9–15 – Motivation, Interest, Grit, and STEM Persistence

Guiding question: How do institutional, cultural, interpersonal, and individual factors jointly promote or constrain sustained STEM participation?

Required readings:

Graham, M. J., Frederick, J., Byars-Winston, A., Hunter, A.-B., & Handelsman, J. (2013). Increasing persistence of college students in STEM. *Science*, 341(6153), 1455–1456.

Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational Psychologist*, 41(2), 111–127.

Crede, M., Tynan, M. C., & Harms, P. D. (2017). Much ado about grit: A meta-analytic synthesis of the grit literature. *Journal of Personality and Social Psychology*, 113(3), 492–511.

Brief application prompt: Identify one institutional or cultural factor and one individual factor affecting STEM persistence, then recommend one multilevel response that does not place responsibility solely on student grit.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, November 15. The required project draft/design prototype is also due November 15.

Week 14: November 16–22 – Culture, Language, Equity, Learner Variability, and Learning Styles

Guiding question: How should instructional design respond to meaningful learner variability without relying on unsupported learner typologies?

Required readings:

Nasir, N. S., Rosebery, A. S., Warren, B., & Lee, C. D. (2006). Learning as a cultural process: Achieving equity through diversity. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 489–504). Cambridge University Press.

Boysen, G. A. (2024). A critical analysis of the research evidence behind CAST's universal design for learning guidelines. *Policy Futures in Education*, 22(7), 1219–1238.

Willingham, D. T., Hughes, E. M., & Dobolyi, D. G. (2015). The scientific status of learning styles theories. *Teaching of Psychology*, 42(3), 266–271.

Brief application prompt: Revise one instructional activity to address a cultural, linguistic, motivational, or accessibility-related need, and explain why learning-style matching would not be an evidence-based substitute.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, November 22.

Week 15: November 23–29 – Learner-, Knowledge-, Assessment-, and Community-Centered Environments

Guiding question: How should learning environments balance attention to learners, disciplinary knowledge, assessment, and community?

Required readings:

Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). How people learn: Brain, mind, experience, and school (Expanded ed.). Chapter on the design of learning environments.

Learn II, H. P. (2018). How people learn II: Learners, contexts, and cultures. Washington, DC, USA: Nat. Acad. Press.

Brief application prompt: Use two of the four learning-environment perspectives to identify one strength and one imbalance in a course or project, then recommend one improvement.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, November 29. An optional comprehensive-examination outline or project update may also be submitted.

Week 16: November 30–December 6 – Instructional Evaluation, AI, and Course Synthesis

Guiding question: How should educators evaluate instructional models, popular learning claims, and emerging technologies using theories and evidence accumulated across the course?

Required readings:

Kirschner, P. A., & van Merriënboer, J. J. G. (2013). Do learners really know best? Urban legends in education. *Educational Psychologist*, 48(3), 169–183.

Alfredo, R., Echeverria, V., Jin, Y., Yan, L., Swiecki, Z., Gasevic, D., & Martinez-Maldonado, R. (2024). Human-centred learning analytics and AI in education: A systematic literature review. *Computers and Education: Artificial Intelligence*, 6, Article 100215.

Learn II, H. P. (2018). How people learn II: Learners, contexts, and cultures. Washington, DC, USA: Nat. Acad. Press.

Brief application prompt: Evaluate one instructional technology or model using one course theory, one criterion for evidence quality, and one consideration related to accessibility, retention, or transfer.

Due: If selected as one of the 10 topics, discussion and application are due Sunday, December 6. The required group presentation is also due December 6; the final project and final examination are due Friday, December 11.