



College of Education | Teacher Education Department
Teaching, Learning and Culture (TLC) PhD Program
TED 6310 (CRN 19163) | Learning Sciences
Fall 2022 Syllabus

<p>Instructor & Contact Information: Justice Toshiba Walker, PhD Primary: Blackboard Course Messages Secondary: jtwalker@utep.edu</p> <p>Special Notice: This section will be delivered in a hybrid format and will meet face to face approximately every other week as specified in the course schedule below). The first meeting will be on 8/25/22. See course schedule for more details.</p>	<p>Meeting Time: Thursdays 6:00-8:50pm MT</p> <p>Duration: August 22nd – December 1st, 2022</p> <p>Location: Primary Education Building Room 405</p> <p>Alternate: LIVE ONLINE via ZOOM (when notified by instructor) Meeting ID: 844 5928 6391 Passcode: LearnSci21</p>
<p>Office Hours: Office hours online on Thursdays at 4:00-6:00pm by appointment (i.e., let me know you are joining to meet) using this link to schedule. Questions are welcomed and encouraged. Email any time.</p> <p>Course Website: We will frequently communicate during our LIVE (in person and online) class sessions, and also through the course website which can be accessed using Blackboard. The function of the course website is primarily for discussion, collaboration on weekly readings, for sharing information or activities that you find interesting and relevant, and for submitting assignments. It is intended to function as a supplement to LIVE (in person and online) engagement.</p>	

General Course Description:

The course examines philosophical, sociocultural, and psychological perspectives in the Learning Sciences in order to engage with ideas about what it means to know and learn. The Learning Sciences is a relatively new field of research in education that began in the late 80s. It is an interdisciplinary field consisting of researchers who study, among other things, cognition, science and math education, language literacy, computer science, and educational psychology. **Learning scientists study learning as it happens in real world contexts—and design resources and environments to improve learning in those contexts.** This can happen in school, in informal places, at work, and online. Although the Learning Sciences is

continually evolving, what remains true of the tenets of this educational field is that **learning happens through mediated processes that most often require collaboration with others and is fundamentally and inextricably linked to context and culture.**

Specific Course Objectives:

The course also places special emphasis on developing mastery along the following strands, including: (i) investigating the roots of the learning sciences field and how it has evolved; (ii) identifying major theories and frameworks that fuel and support learning; (iii) understanding how learning processes interact with contextual and cultural variables that meet the needs of all learners.

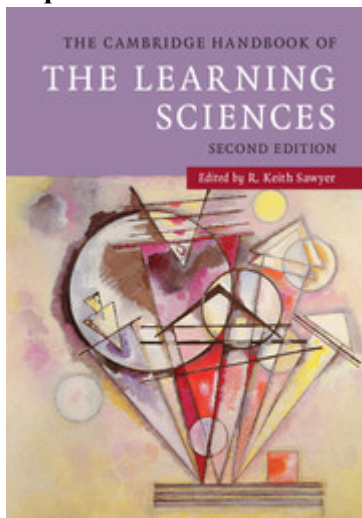
As such, at the conclusion of the course, you should be able to: (i) articulate, using informed reasoning, cognitive and sociocultural processes that result in effective learning and teaching; (ii) critically discuss evaluate, and synthesize insights about Learning Sciences in relation to existing conceptualizations of teaching and learning, (iii) situate your (practical and theoretical) perspectives on effective teaching and learning in relation to extant Learning Sciences literature.

To evaluate these outcomes, I will use the following assessment procedures: Formative evaluation of discussions, online interactions, and course engagement/productivity as well as formative assessment of written assignments and course presentations.

Course Structure:

This is a hybrid in person class that will use Zoom, UTEP Blackboard, and several other online resources to support both synchronous LIVE and asynchronous engagement. Classes will be arranged as weekly modules—that is, each week is “packaged” as a single module so that all the materials, lecture notes, submission areas, and discussion posts are in one area for a given week. It is expected that students will participate in all activities.

Required Text:



Sawyer, R. K. (Ed.). (2014). *The Cambridge handbook of the learning sciences*. Second Edition. Cambridge University Press.

Optional Resources:

Sawyer, R. K. (Ed.). (2005). The Cambridge handbook of the learning sciences. Cambridge University Press.

Technology Requirement:

Given this is a hybrid course (meeting in person every other week beginning 8/24), course content will be supplemented using [Zoom](#) and the Blackboard learning management system. Thus, you will need to have access to a computer/laptop. Ensure your UTEP email account is working and that you have access to the Web and a stable web browser. **Note: For students with laptop computer access, visit this link to apply to check out a device with UTEP technology support: <https://semesterlaptop.questionpro.com/>.**

If you do not have word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint, Outlook and more) for free via UTEP's Microsoft Office Portal. [Click the following link](#) for more information about Microsoft Office 365 and follow the instructions.

IMPORTANT: If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP Help Desk as they are trained specifically in assisting with technological needs of students. You may reach the [UTEP Technology Support Help Desk](#) at 915-747-HELP (4357). Please do not contact me for this type of assistance. The Help Desk is much better equipped than I am to assist you!

Course Communication (How we will stay in contact with each other): Because this is a hybrid class, we will see each other every other week—either in person or LIVE on Zoom. For asynchronous portions of the course, we will stay in touch using the following communication channels:

Office Hours: We will likely not be able to meet on campus, but I will still have office hours for your questions and comments about the course. You can schedule a meeting with me using this link: <https://calendly.com/justicewalker>.

Email: Blackboard Course Messaging is the best way to contact your course instructors (your TA and I). We will make every attempt to respond to your message within 24-48 hours of receipt. When messaging us, be sure to clearly state your question.

Discussion Board: If you have a question that you believe other students may also have, please post it in the Help Board of the discussion boards inside of Blackboard. Please respond to other students' questions if you have a helpful response.

Announcements: Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

Course Assignments and Weighting:

Assignment Category	Percentage
Participation and Engagement (weekly): Class attendance, participation and engagement is required and will be assessed as a completion score (i.e., attendance/participation/completion will earn full credit, absence/non-participation will earn none). These activities will be labeled “P&E” when applicable. <u>PLEASE NOTE: MORE THAN TWO ABSENCES IN THIS COURSE WILL RESULT IN NO MORE THAN 5% CREDIT IN THIS ASSIGNMENT CATEGORY.</u>	15%
Demonstration: You will lead ONE 15-20 minute interactive discussion/demonstration activity that summarizes, critiques, and/or synthesizes salient ideas addressed in course discussions, readings, instructional slides and, when appropriate, pertinent outside sources. SIGN UP HERE. PLEASE NOTE, THERE ARE NO MAKE UPS FOR MISSED PRESENTATIONS OR OPPORTUNITIES THAT RESULTED FROM NOT SIGNING UP TO PRESENT. THIS IS A STRICT POLICY.	10%
Written Critiques (3000-4000 words each): You will write five critiques based on readings selected from the “ Critique Reading Reference List ” appended at the end of this syllabus. Please notice, you may only select readings available for the corresponding critique number (i.e., you can only select articles under critique #3 to write about for critique #3). The goal of this activity is to give you practice developing written critical argumentation practices grounded in the Learning Sciences literature. Each of these critiques should include the following sections: (i) Critical Introduction with Clear Argument, (ii) Summary of Key Ideas, (iii) Critical Analysis, and (iv) Conclusion. The scoring rubric is listed in this syllabus in the next sections.	50%
Peer Review (500-600 words each): Using a double-blind-review approach, you will write ten peer reviews of written critiques using a prescribed evaluation rubric. Each review should address the following areas (i) Knowledge of Content and Summary, (ii) Critical Thinking and Argumentation, (iii) Organization and Communication Accuracy.	25%

Grading Scheme:

Letter grade	Range of percent
A (Excellent)	100-90%
B (Above Average)	89-80%
C (Average)	79-70%
D (Below Average)	69-60%
F (Failing)	< 60%

Course Guidelines:

Absences and/or Course Drop: According to UTEP Curriculum and Classroom Policies, “When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of “W” before the course drop deadline and with a grade of “F” after the course drop deadline.” See academic regulations in the UTEP Undergraduate Catalog for a list of excuse absences. Therefore, if I find that, due to excessive absences (more than two) or non performance in the course—you are at risk of failing and I will drop you from the course. I will provide 24 hours advance notice via email.

Incomplete Grade Policy: Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

Engagement: Course members (i.e., students) are expected to complete all online class modules and be thoroughly prepared to engage in course reading and discussions. There will be a 5% deduction of your total grade for any missed classes. This is in addition to penalties associated with missed assignments.

Completion Period: Assignments are to be submitted through Blackboard Assignment on the date indicated by 11:59 PM. No hard copies of assignments will be accepted. If assignments are accepted late, a 10-percent penalty for every 24-hour period of tardiness will be deducted beginning after the submission due date and time (e.g an assignment due May 28th at 9:00 am via Blackboard is considered late at 9:01am). **Any possibility for an extension must be approved at least 48 hours in advance of the due date and does not guarantee penalty waiver. To be clear: assignments may not be accepted if no prior arrangement has been made with the instructor.** Late assignments will only be accepted penalty free in documented cases of medical or technical difficulties that are reported 48 hours before the due date. Please try to submit assignments on time or early. **Missed assignments will not be accepted.**

Language Use: For this course to meet objectives and to be effective it is expected course members be respectful to one another and the diverse groups with which we engage. This is especially important when discussing or sharing about our different perspectives and experiences. In addition, it is an essential aspect of this course that we practice, demonstrate and reflect on the language we use to describe and discuss individuals with language or intellectual differences. This guideline is not intended to limit your freedom of expression, but instead to deepen your consideration of how we use language and the impacts that use has on how we understand others.

Class Community and Professionalism: Course members are expected to participate actively and meaningfully in each class, module, and discussion board. This includes making connections between reading assignments and discussions. It is expected for members to ask questions and raise issues throughout our time together in ways that serve to promote thinking, idea exchange and critical reflection.

Academic Integrity: Students are expected to uphold the highest standards of academic integrity that are consistent with course norms and practices. Any form of scholastic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are not attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures (HOP) and available in the Office of the Dean of Students, may result in sanctions ranging from disciplinary probation, to failing grades on the work in question, to failing grades in the course, to suspension or dismissal among others.

PLEASE NOTE: ASSIGNMENTS IN THIS COURSE ARE ASSESSED FOR ORIGINALITY USING ONLINE TOOLS.

Accommodations Policy: The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting accommodation based on a disability must register with the UTEP Center for Accommodations and Support Services (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the CASS portal.

Equal Educational Opportunity: In order to create equal educational opportunities in the class, all students are expected to demonstrate respect for the diverse voices and individual differences in the class. Particularly, no person shall be excluded from participation in, denied benefits of, or be subject to discrimination under any program or activity sponsored or conducted by the University of Texas at El Paso on the basis of race, color, national origin, religion, sex, age, veteran status, disability, or sexual orientation. Any member of the University community who engages in discrimination or other conduct in violation of University policy is subject to the full range of disciplinary action, up to and including separation from the University. Complaints regarding discrimination should be reported to the University's Equal Opportunity Office. Inquiries regarding applicable policies should be addressed to the University's Equal Opportunity Office, Kelly Hall, 3rd Floor, 915.747.5662 or eoaa@utep.edu.

Inclusiveness and Equity: A priority in our classroom is to cultivate relationships of trust and respect and a sense that we see each other as whole, complex human beings. To that end, I want you to know that all of you are welcome in our virtual classroom space—all the parts of you as a person are welcome in our discussions, our activities, our assignments, and in our assessments. We are all complex people with a variety of perspectives, experiences, challenges, assets, and resources—our gender identities, our sexual orientations, our religions, our races, our ethnicities, our economic statuses, our immigration statuses, our parenthoods, our veteran statuses, our ages, our languages, our abilities and disabilities. All the parts of

you are welcome in our learning community to the extent that you feel comfortable bringing them in. I strive to show respect for the variety and wholeness in each of you, and I expect that each of you shows respect for each other as well. If you feel marginalized in our class, and you feel comfortable discussing it, I would like to know so that I can support you, protect you, and make changes that feel more inclusive and equitable. You can also talk with our Department Chair and/or you can report a complaint of discrimination to the University's Equal Opportunity Office, Kelly Hall, Third Floor, 915-747-5662 or eoaa@utep.edu.

Carefully Edited Written Products: Carefully proof and edit your writing. Excellent grammar and syntax, as well as, appropriate APA citations are expected. Guidance on this format can be found at: <http://owl.english.purdue.edu/owl/resource/560/01/> or <http://www.apastyle.org/>.

Supplemental Resources (Where you can go for assistance):

Technology Resources: Help Desk: Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus. If these technical challenges affect your participation in the course, please report them to the [UTEP Technology Support Helpdesk](#) promptly, and then forward the case number to me.

Academic Resources: **UTEP Library:** Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.

University Writing Center (UWC): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources. **Math Tutoring Center (MaRCS):** Ask a tutor for help and explore other available math resources. **RefWorks:** A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide. **Grammarly:** <https://www.grammarly.com/>.

Individual Resources: **Military Student Success Center:** Assists personnel in any branch of service to reach their educational goals. **Center for Accommodations and Support Services:** Assists students with ADA-related accommodations for coursework, housing, and internships. **Counseling and Psychological Services:** Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

COVID-19 PRECAUTION STATEMENT

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org.

Written Critiques:

To write a critique of a text is to analyze and evaluate it, not just summarize. A summary merely reports what the text said; that is, it answers only the question, "What did the author say?" A critique, on the other hand, analyzes, interprets, and evaluates the text, answering such questions as "Why?" and "How Well?" A critique does not necessarily have to criticize the piece in a negative sense. Your reaction to the text may be largely positive, negative, or a combination of the two. It is important to justify how you reached your perspective.

The critique is a rigorous critical reading of a text (e.g., article, chapter, passage). As such, it picks up where the objective summary leaves off. In fact, a critique can include a brief summary so that its readers will be able to quickly grasp the main ideas and proofs of the text under examination. There are myriad forms of critique, but a good starting approach to writing critically is to plan along the following lines: First, actively engage the passage, and thoroughly—making note of questions, concerns, or critical ideas that come to mind as you read. Spend some time on this step. It can be difficult to sufficiently critique a text if you don't fully understand it.

Next, write a short summary. Identify the author's central argument (thesis or rationale) and list the types of warrants or proofs used to convince the reader to accept the rationale. For example, does the author use historical perspectives, quote noted authorities, provide statistical evidence, or appeal to a reader's commonsense? You should also try to figure out why the author is writing, and to whom. Remember that the purpose of a paper and its intended audience can affect the way the paper is written.

You should also interrogate the validity and/or logic of the argument. Sometimes it can be helpful to read outside sources, such as commentaries, response papers, or articles with competing viewpoints to fully ascertain how well the author advances a rationale for the paper. You might also consider whether the author provides complete and accurate information—or leaves out important facts. Guiding considerations can include: whether the author sufficiently defined key terms, whether you agree with the author's warrants, and the intellectual merit or value of the author's contribution. The strength of your critique will rely on your ability to cogently articulate your assessment and provide a reasonable justification for your perspectives.

For this course, your critique should have the following sections with content consistent with the accompanying descriptions:

Critical Introduction: The introduction should provide the reader with a basic overview or background of the rationale presented in the original piece so that the reader can readily situate your critique in relation to the original work. You might also supplement the overview by including relevant contexts such as the social, cultural, or historical relevance of the original text. You should also be sure to be explicit and clear about the critiques or arguments you will advance in your critique/assessment.

Summary of Key Ideas: The summary should be a brief account of salient points or ideas you will engage in the critique. This will provide the reader a frame of reference for topics with which you will engage in the critique.

Critical Analysis: This is a core component of your critique and should include an in-depth analysis of the author's warrants, logic, and/or use of evidence related to the selected points you raised in the summary. Here you should not only provide an assessment of the original work, but also include your response using evidence, counter-evidence, references, and argumentation. Should should also consider discussion of the original work in relation to its strengths, weaknesses, limitations, constraints, and/or affordances.

Conclusion: In this short section you should summarize the overall trajectory of your critique—being sure to reiterate key ideas such as the significance of the original work, your critique, and implications for future work.

Critique Rubric:

	Strong (10-9 points)	Fair (8.9-7.5 points)	Underdeveloped (7.4 or below points)
Knowledge of Content and Summary	Solid knowledge and understanding of the issue to be critiqued is demonstrated. The article is clearly but succinctly summarized - the key points of the article are addressed.	Good knowledge and understanding of the issue to be critiqued is demonstrated. The article is clearly summarized, but it lacks a focus on key points. The summary is not succinct.	Weak knowledge and understanding of the issue to be critiqued is demonstrated. The article summary is unclear or overly detailed.
Critical Thinking and Argumentation	Strengths and weaknesses that are central to the key points of the article are addressed. The discussion of strengths and weaknesses take up the majority of the assignment.	Strengths and weaknesses that are peripheral to the article are addressed. The discussion of strengths and weaknesses take up the majority of the assignment.	Strengths and weaknesses are addressed peripherally or not at all. The discussion of strengths and weaknesses take up only a small part of the assignment.
Organization and Communication Accuracy	Paper is well organized, has a very clear intro, body and conclusion. The purpose of the paper is clear from the beginning. There are no grammatical errors or typos. APA and page length requirements are met.	Paper is organized, has an intro, body and conclusion. The purpose of the paper becomes clear within the paper. There are few grammatical errors or typos. APA and page length requirements are met.	Paper is not well organized, has an unclear or non-existent intro, body and conclusion. The purpose of the paper is unclear. There are many grammatical errors and/or typos. APA and page length requirements not met.

Presentation Rubric:

	Well Articulated (10-9)	Sufficiently Articulated (8.9-7.5)	Needs Further Development (7.4 or below)	Comments
Topic Identification and Importance. The presentation introduces and describes the basic tenets of the topic, why it is important in education and/or the need for engaging with the topic under consideration.				
Synthesis of Ideas. The presentation critically synthesizes key ideas including, critically examining argumentation issues, gaps in the existing literature, or problems in the existing theoretical landscape.				
Implications for Learning and/or Instruction. The presentation addresses implications the topic has for education and/or the Learning Sciences.				
Coherence and Style. The presentation is clear, organized, cogent, and has a convincing line of thought.				

Course Schedule Changes: As course instructor, I reserve the right to adjust the course syllabus or change assignments as needed. I will be sure to give you plenty of notice prior to any changes. Remember that our course syllabus and class schedule are living documents and can be changed

Course Schedule:

Class Date	Readings/Activities/(Due Dates)
8/25	Format: In Person Activities: Introductions and Syllabus Review, Learning Sciences: Past, Present and Future Read: Foundations of the Learning Sciences (p21-43) Due: Self Reflection (8/31)
9/1	Format: Asynchronous Activities: Summary Discussion, Reading Critiques, Open Forum Read: Scaffolding (p44-62) Read: Meta Cognition (p63-87) Due: Critique #1 (9/6)—see reading list below.
9/8	Format: In Person Read: Cognitive Apprenticeship (p109-127) Due: Peer Review Critique (9/14)
9/15	Format: In Person Read: A History of Conceptual Change Research (p88-108) Read: Design-Based Research: A Methodological Toolkit for Engineering Change (p151-170) Due: Critique #2 (9/21)—see reading list below.
9/22	Format: Asynchronous Activities: Summary Discussion, Reading Critiques, Open Forum Read: Analyzing Collaboration (p. 191-212) Read: Educational Data Mining and Learning Analytics (p253-274) Due: Peer Review Critique (9/28)
9/29	Format: In Person Activities: Summary Discussion, Reading Critiques, Open Forum Read: Project-Based Learning (p275-297) Read: Problem-Based Learning (p298-318)
10/6	Format: In Person Read: Complex Systems and the Learning Sciences (p319-338) Read: Videogames and Learning (p377-396) Due: Critique #3 (10/12)—see reading list below.
10/13	Format: Asynchronous Activities: Summary Discussion, Reading Critiques, Open Forum Read: Knowledge Building and Knowledge Creation: Theory, Pedagogy, and Technology (p397-417) Read: Arguing to Learn (p439-460)

	Due: Peer Review Critique (10/19)
10/20	Format: Asynchronous Read: Informal Learning in Museums (p461-478) Read: Computer-Supported Collaborative Learning (p479-500) Due: Critique #4 (10/26)—see reading list below.
10/27	Format: In Person Activities: Summary Discussion, Reading Critiques, Open Forum Read: Mobile Learning (p501-521) Read: Learning in Virtual Worlds (p522-544) Due: Peer Review Critique (11/2)
11/3	Format: Asynchronous Read: Science Education and the Learning Sciences as Coevolving Species (p565-586) Read: Arts Education and the Learning Sciences (p626-648)
11/10	Format: In Person Activities: Summary Discussion, Reading Critiques, Open Forum Read: Learning Sciences and Policy Design and Implementation: Key Concepts and Tools for Collaborative Engagement (p659-667) Read: Designing for Learning: Interest, Motivation, and Engagement (p668-685) Due: Critique #5 (11/16)—see reading list below.
11/17	Format: In Person Read: Learning as a Cultural Process: Achieving Equity through Diversity (p686-706)
11/24	Format: Asynchronous Read: A Learning Sciences Perspective on Teacher Learning Research (p707-725) Due: Peer Review Critique (11/30)
12/1	Format: Asynchronous Read: The Future of Learning: Grounding Educational Innovation in the Learning Sciences (p726-746)

Critique Reading Reference List:

Learning Sciences Overview (Critique #1):

- Hoadley, C. (2018). A short history of the learning sciences. In F. Fischer, C. Hmelo-Silver, S. Goldman and P. Reimann (Eds.) *The International Handbook of the Learning Sciences* (pp. 11–23). New York, NY: Routledge Press.
- Sommerhoff, D., Szameitat, A., Vogel, F., Chernikova, O., Loderer, K., & Fischer, f. (2018). What do we teach when we teach the learning sciences? A document analysis of 75 graduate programs. *Journal of the Learning Sciences*, 27, 319–351.
- Kolodner, J. (2004). The learning sciences: Past, present and future. *Educational Technology*, 44(3), 37–42.
- Nathan, M. J., Rummel, N., & Hay, K. E. (2016). Growing the learning sciences: Brand or big tent? Implications for graduate education. In M. A. Evans, M. J. Packer, & R. K. Sawyer (Eds.), *Reflections on the learning sciences* (pp. 191–209). New York, NY: Cambridge University Press.
- Pea, R. (2016). The prehistory of the learning sciences. In M. Evans, M. Packer, & K. Sawyer (Eds.), *Reflections on the Learning Sciences*, (pp. 32-58). New York: Cambridge University Press.

Learning Processes: Forms of Cognition (Critique #1):

- Alibali, M.W., Nathan, M (2018). Embodied cognition in learning and teaching. In F. Fischer, C. Hmelo-Silver, S. Goldman and P. Reimann (Eds.) *The International Handbook of the Learning Sciences* (pp. 75–85). New York, NY: Routledge Press.
- Hofer, B. (2016). Epistemic cognition as a psychological construct. In J.A. Greene, W.A. Sandoval and I. Braten (Eds.) *Handbook of Epistemic Cognition* (pp. 19–38. New York, NY: Routledge Press.
- Danish, J., & Gresalfi, M. (2018). Cognitive and sociocultural perspectives on learning. In F. Fischer, C. Hmelo-Silver, S. Goldman and P. Reimann (Eds.) *The International Handbook of the Learning Sciences* (pp. 34–43). New York, NY: Routledge Press.
- Greene, J.A., Sandoval, W.A., & Braten, I. (2016). An introduction to epistemic cognition. In J.A. Greene, W.A. Sandoval and I. Braten (Eds.) *Handbook of Epistemic Cognition* (pp. 1–15. New York, NY: Routledge Press.
- Lindgren, R., & Johnson-Glenberg, M. (2013). Emboldened by embodiment: Six precepts for research on embodied learning and mixed reality. *Educational Researcher*, 42(8), 445–452.

Collaboration and Social Learning: Collaboration, Scripting, and Scaffolding (Critique #2):

- Kollar, I., Wecker, C., & Fischer, F. (2018). Scaffolding and scripting (computer-supported collaborative learning). In F. Fischer, C. Hmelo-Silver, S. Goldman and P. Reimann (Eds.) *The International Handbook of the Learning Sciences* (pp. 340–350). New York, NY: Routledge Press.
- Slakmon, B., & Schwarz, B.B. (2017). “Wherever you go, you will be a polis”: Spatial practices and political education in computer-supported collaborative learning discussions. *Journal of the Learning Sciences*, 26, 184–225.

Learning Processes: Multiple Representations, Learning Supports, and Learning Activities (Critique #2):

- Ainsworth, S. (2018). Multiple representations and multimedia learning. In F. Fischer, C. Hmelo-Silver, S. Goldman and P. Reimann (Eds.) *The International Handbook of the Learning Sciences* (pp. 96–105). New York, NY: Routledge Press.

- Chi, T.H.M. (2009). Active-constructive-interactive: A conceptual framework for differentiating learning activities. *Cognitive Science*, 1, 73–105.
- Yoon, S., Elinich, K., Wang, J., Steinmeier, C., & Tucker, S. (2012). Using Augmented Reality and Knowledge-Building Scaffolds to Improve Learning in a Science Museum. *International Journal of Computer Supported Collaborative Learning*, 7(4), 519–541.

Learning Processes: Complex Systems (Critique #3):

- Yoon, S.A. (2018). Complex systems and the learning sciences. In F. Fischer, C. Hmelo- Silver, S. Goldman and P. Reimann (Eds.) *The International Handbook of the Learning Sciences* (pp. 157–166). New York, NY: Routledge Press.
- Yoon, S., Klopfer, E., Anderson, E., Koehler-Yom, J., Sheldon, J., Schoenfeld, I., Wendel, D., Scheintaub, H., Oztok, M., Evans, C., & Goh, S. (2016). Designing computer- supported complex systems curricula for the Next Generation Science Standards in high school science classrooms. *Systems*, 4(38), 1–18.
- Jacobson, M. (2000). Problem solving, cognition, and complex systems: Differences between experts and novices. *Complexity*, 6(3), 41–49.
- Chi, M.T.H., Roscoe, R.D., Slotta, J.D., Roy, M., Chase, C. (2012). Misconceived causal explanations for emergent processes. *Cognitive Science*, 36, 1–61.
- Hmelo-Silver, C.E., Marathe, S., Liu, L. (2007). Fish swim, rocks sit, and lungs breathe: Expert-Novice understanding of complex systems. *Journal of the Learning Sciences*, 16(3). 307–331.
- Levy, S., Wilensky, W. (2008). Inventing a “mid level” to make ends meet: Reasoning between the levels of complexity. *Cognition and Instruction*, 26, 1–47.
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Collaboration and Social Learning: Inquiry and Problem-Solving (Critique #3):

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