College of Education | Teacher Education Department
Teaching, Learning and Culture (TLC) Program
STEM 6303 (CRN 19153)/TED 5319 (CRN 19152) | Research Trends in STEM Education
Fall 2022 Syllabus

Instructor & Contact Information: Justice Toshiba Walker, PhD Primary: Blackboard Course Messages Secondary: jtwalker@utep.edu **Teaching Assistant & Contact Information:** Alan Barrera Primary: Blackboard Course Messages Secondary: abarrera6@miners.utep.edu **Special Notice:** This section will be delivered in a hybrid format and will meet face to face approximately every other week. The first meeting will be on 8/24/22. See course schedule for details.	**Meeting Time:** Wednesdays | 5:30-8:20pm MT **Duration:** August 22nd – December 1st, 2022 **Location:** Primary Education Building Room 405 Alternate: LIVE ONLINE via ZOOM (when notified by instructor) Meeting ID: 892 9467 1800 Passcode: c0nstruct
Office Hours: Office hours online by appointment on Wednesdays at 3:30-5:30pm, using this link to schedule. Questions are welcomed and encouraged. Email any time. **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.	

General Course Description:
This course is a survey of contemporary research theories, methods, design considerations, and applications through which educational researchers/learning scientists/learning engineers understand and design environments to improve STEM + C (for computing) learning. The course features the most recent trends in learning primarily through burgeoning education disciplines and technologies. It includes perspectives that consider: who is learning, how it is being learned, what design variables are needed to ensure learning takes place in different learning environments, and societal contexts and technological factors that shape learning.

This course draws on learning science perspectives (and most notably constructionism)— a field of research in education that began in the late 80s and that builds on Piagetian and Vygokskian traditions in constructivism. The learning sciences is an interdisciplinary field consisting of researchers who study among other things, cognition, STEM +C (for computing) education, language literacy, anthropological and sociocultural perspectives, 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, and online—all of which we will explore in this course. As such we will explore contemporary research trends in STEM education that include the theorization and design of resources and environments—which can include curricula, instructional strategies, digital and computational tools.

Four main learning goals underpin the course content:

1. Understanding contemporary trends in STEM + C (for computing) education research.
2. Investigating the main learning theories and methods influencing STEM + C (for computing) and how they are instantiated in research and practice.
3. Examining and reflecting on how technology can augment or support learning environments and address important learning challenges.
4. Evaluating how STEM + C (for computing) research has helped understand learning processes, how they have not, and how they can be improved.

The trajectory of this course occurs across two themes which are woven throughout:

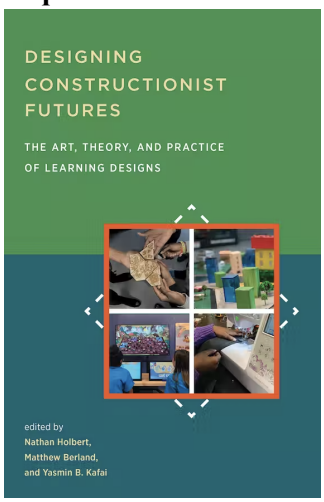
Theme I: Contemporary Learning Foundations, Theories, Priorities, and Research Methods: This section investigates current theories, relationships to real world learning, and methods that inform contemporary STEM + C (for computing) education research.

Theme II: Supporting STEM + C Learning, Applications, and Learning in Practice
This section investigates the STEM + C (for computing) learning designs, goals that structure learning events, specific applications, and practice.

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:



Holbert, N., Berland, M., & Kafai, Y. B. (Eds.). (2020). *Designing Constructionist Futures: The art, theory, and practice of learning designs*. MIT 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 Assignment Descriptions:

In-class Participation and Attendance (8%)

Please be advised that cooperative group learning structures conducive to knowledge building will be a primary teaching and learning strategy in the class. As such, your participation in face-to-face meetings as well as on the course website is critical to not only your own learning but also the learning of others. LEASE NOTE: MORE THAN TWO ABSENCES IN THIS COURSE WILL RESULT IN NO MORE THAN 1% CREDIT IN THIS ASSIGNMENT CATEGORY

Weekly Online Discussions (32%, Due weekly)

In order to build a collaborative learning community, this on-going assignment involves posting and responding to comments, thoughts, insights or reflections online with respect to the weekly readings and your own related educational experiences. Use this virtual space to connect with other classmates to help you think through the concepts we are learning in the course. Virtual environments like these often become self-organized and take off without a minimum participation criteria enforced. However, as everyone's continuous participation is essential in creating this virtual community, a minimum of 2 posts per week is required. For the 2-post minimum, EACH post should include:

1. Selected information or data from the literature;
2. Interpretation of the literature;
3. Relationships you draw from the literature between your understanding and another student's post, literature from the class, or literature from outside sources;
4. Experiences you have had based on practice or points you would like to contribute based on your own understanding.

Beyond the 2-post minimum, you can respond or comment as many times as you would like without adhering to the above criteria.

Since you will need time to do the readings before you can participate on the site, discussion for the upcoming set of readings should begin by noon MT on Friday (i.e., two days after class) and continue until 11:59 MT on Monday leading up to class.

Discussion Facilitator (10%, Due weeks between Sept 7th and Nov 16th)

You will sign up to be a discussion facilitator (linked HERE)—sign up should be done no later than the end of the first day of class. There are two parts to this assignment.

The first part entails initiating (through discussion board prompt), monitoring, and evaluating the class's online discussion. You will read each post and assign a point score of 0 to 4 depending on completion using the above criteria. After you have evaluated each group member's collective posts, please email them with their score and copy Alan Barrera (abarrera6@miners.utep.edu)/myself (jtwalker@utep.edu) no later than Tuesday morning at noon MT. You should incorporate exemplary posts in your presentation (detailed in the next paragraph).

For the second part, you will summarize the main ideas that have emerged from the class's online discussion. You should prepare a 30-40 minute presentation and lead a whole class discussion on the issue or interesting point starting with or in relation to weekly reading assignments (and preferably drawn from the optional reading list—although this is NOT required). Choosing alternative formats for the discussion is strongly encouraged. You will also be responsible for designing relevant BlackBoard discussion prompts and facilitating discussion online—this should occur in the week before your presentation. PLEASE NOTE: Due to the nature of this synchronous activity, MAKEUP PRESENTATIONS (i.e., you are unable to present on the day for which you signed up) will earn no higher than 1%.

Theorizing Practice Paper (25%; Due October 12)

An essential aspect of the field of the learning sciences and STEM education research is the practical or applied nature of research activities. From student curricular experiences to teacher professional development, much learning sciences research focuses on how particular interventions informed by theories of design, culture, and cognition, impact classrooms and other educational real world contexts.

In this assignment, you will begin with an educational experience you have observed, led, or participated in for which the design of the learning environment fundamentally influenced learning outcomes. In a 3-4 page single-spaced (11 point Times New Roman/Arial font) paper (excluding references), you will critically analyze the experience using the topics or lenses we have investigated in the first 6 weeks of the course. In addition to the course readings, a review of at least two other external sources is required (these may also be drawn from the optional references listed for each week).

Begin your paper with a short (1-2 paragraph) description of a specific episode or ongoing issue you have experienced in practice (sometimes I refer to this as a problem of practice). Identify the issue or problem of practice as a specific question. You will then organize your paper around a response to this specific question and provide descriptions or explanations from your experience and the literature to support your claims. You will be evaluated on the depth to which you have addressed the question, evidence to support your claims, and the coherence and consistency of the paper. Make sure to reference the literature in your paper (including a reference section at the end). Please see the specific scoring rubric for papers in the later sections of this syllabus.

Design of Learning Environment/Research Intervention/Theoretical Framework (25%; final due November 23)

For this assignment, you will construct a learning environment, research intervention OR theoretical framework in a group of two or on your own based on topics in the course or one that you are interested in. This should be in relation to topics (and readings) drawn from the course reading list. If you are in the field of professional development, you can create an online module for your target group and context. If you are a researcher interested in mobile technologies, you may be interested in designing an app (you don't actually have to build the app but you need to provide details and description about how the app environment works and its functionality) that can be used in a research design. If you are writing a research proposal, you may be interested in conducting a literature review or research methodologies on contemporary issues related to the topic you are pursuing. On November 4, you will submit a half page

outline of the final assignment that includes product information, target population and group members (this is not graded)—it will give your TA and I a sense of your direction and partners.

Course Assignments and Weighting Summary:

Assignment Category	Percentage
Participation and Engagement (weekly)	8%
Discussion Facilitator (Due weeks between Sept 7th and Nov 16th)	10%
Weekly Online Discussions (Due weekly)	32%
Theorizing Practice Paper (Due October 12)	25%
Design of Learning Environment/Research Intervention/Theoretical Framework (final due November 23)	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.

Generalized Framework for Written Papers:

To write a synthesis 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 “HowWell?” 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 synthesis 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 synthesis 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 our 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 authors 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 synthesis could have the following sections with content consistent with the accompanying descriptions:

Introduction/Problem of Practice Statement: The introduction should provide the reader with a basic overview or background of the original piece so that the reader can readily situate the thesis or problem of practice 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 assessment of the problem and proposed solution.

Summary: 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.

General Paper Rubric:

	Strong (9-10 points)	**Fair (7.5-8.9 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 around Salient Problem of Practice	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.

General Presentation Rubric:

	Well Articulated (10-9.0)	**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

Detailed Course Schedule:
Please Note: readings and presentations should be completed before class session for a given week (e.g., readings/summary discussion for week of 8/30 should be completed before class on 8/31).

Class	Topic/Format/Readings/Due Dates
8/24	**Topic: Contemporary Visions of Technology and Learning part I** **Format: In Person** **Required Readings:** Freeman, A., Adams Becker, S., Cummins, M., Davis, A., and Hall Giesinger, C. (2017). NMC Horizon Report: 2017 K-12 Edition. Austin, Texas: The New Media Consortium. Anderson, J., & Raine, L. (2014). Digital life in 2025: Pew Research Internet Project. Retrieved from http://www.pewinternet.org/2014/03/11/digital-life-in-2025/. Designing Constructionist Futures (DCF): Pg ix-xiii (Foreword: Seymour *is* a Powerful Idea) Pg. 1-16 (Introduction: Fifty Years of Constructionism) **Due (date): Initial Discussion Board Post (8/26)**
8/31	**Topic: Contemporary Visions of Technology and Learning part II** Format: Asynchronous **Required Readings:** Saavedra, A. R., & Opfer, V. D. (2012). Teaching and learning 21st century skills: Lessons from the learning sciences. A Global Cities Education Network Report. New York, Asia Society, 10. Nathan, M. J., & Wagner Alibali, M. (2010). Learning sciences. Wiley Interdisciplinary Reviews: Cognitive Science, 1(3), 329-345. DCF: Pg. 73-84 (Why School Reform is Impossible) **Due (date): Initial Discussion Board Post (9/2)**
9/7	**Topic: Learning Theory part I** **Format: In Person** **Required Readings:** Partnership for 21st Century Skills (2007). The Intellectual and Policy Foundations of the 21st Century Skills Framework. Tucson, AZ 1-24. Collins, A. (1991). Cognitive apprenticeship and instructional technology. *Educational values and cognitive instruction: Implications for reform*, *1991*, 121-138. DCF: Pg. 21-30 (Engaging Learners in Constructing Constructionist Environments) **Optional Readings (To be Used for Class Presentations):**

	Boyd, D. (2014). Literacy, are today's youth digital natives? Chapter 7 (pp. 176-198). In It's complicated, the social lives of networked teens. Sogunro, O.A. (2015). Motivating factors for adult learners in higher education. International Journal of Higher Education, 4(1), 22–37. **Due (date): Initial Discussion Board Post (9/9), Discussion Facilitator and Summary Presentation #1 (9/7)**
9/14	**Topic: Learning Theory part II** **Format: In Person** **Required Readings:** Woolley, N. N., & Jarvis, Y. (2007). Situated cognition and cognitive apprenticeship: A model for teaching and learning clinical skills in a technologically rich and authentic learning environment. Nurse education today, 27(1), 73-79. Sandoval, W. A., & Bell, P. (2004). Design-based research methods for studying learning in context: Introduction. Educational psychologist, 39(4), 199-201. DCF: Pg. 311-322 (Syntonicity and Emergence: A Design Based Research Reflection on the Piagetian Roots of Constructionism) **Due (date): Initial Discussion Board Post (9/16), Discussion Facilitator and Summary Presentation #2 (9/14)**
9/21	**Topic: New Literacies in Contemporary Tech** Format: Asynchronous **Required Readings:** Leu, D., McVerry, J. O'Bryne, W., Kiili, C., et al. (2011). The new literacies of online reading comprehension: Expanding the literacy and learning curriculum. Journal of Adolescent & Adult Literacy, 55(1), 5-14. Thompson, C. (2013). The new literacies. In Smarter than you think: How technology is changing our minds for the better (pp. 83-113). New York, NY: The Penguin Press. Kafai, Y., Proctor, C., & Lui, D. (2020). From theory bias to theory dialogue: embracing cognitive, situated, and critical framings of computational thinking in K-12 CS education. ACM Inroads, 11(1), 44-53. DCF Pg. 375-380 (Advancing Making with Biology) **Optional Readings (To be Used for Class Presentations):** Kinzer, C. K., Leu, D. J., & Peters, M. A. (2017). New Literacies and new literacies within changing digital environments. Encyclopedia of educational philosophy and theory. Singapore: Springer.

	Kafai, Y. B., Hogan, K. M., Telhan, O., & Walker, J. T. (2020, October). Learn.Design.Bio.K12: A workshop report on connecting computing and biodesign in K-12 education. Philadelphia, PA: University of Pennsylvania. Available at: learn.design.bio. **Due (date): Initial Discussion Board Post (9/23)**
9/28	**Topic: Big Data and Learning Analytics** **Format: In Person** **Required Readings:** Baker, R., & Seimans, G. (2014). Educational data mining and learning analytics. In K. Sawyer (ed.), The Cambridge Handbook of the Learning Sciences, (pp. 253–272). New York: Cambridge University Press. Slater, S., Joksimović, S., Kovanovic, V., Baker, R. S., & Gasevic, D. (2017). Tools for educational data mining: A review. Journal of Educational and Behavioral Statistics, 42(1), 85-106. Fischer, C., Pardos, Z. A., Baker, R. S., Williams, J. J., Smyth, P., Yu, R., ... & Warschauer, M. (2020). Mining big data in education: Affordances and challenges. Review of Research in Education, 44(1), 130-160. **Optional Readings (To be Used for Class Presentations):** Wise, A.F., Zhao, Y., Hausknecht, S.N. (2013). Learning analytics for online discussions: A pedagogical model for intervention with embedded and extracted analytics. LAK '13, 48-56. **Due (date): Initial Discussion Board Post (9/30), Discussion Facilitator and Summary Presentation #3 (9/28)**
10/5	**Topic: Blended Learning/MOOCs/Online Learning** **Format: In Person** **Required Readings:** Liyanagunawardena, T. R., Adams, A. A., & Williams, S. A. (2013). MOOCs: A systematic study of the published literature 2008-2012. International Review of Research in Open and Distributed Learning, 14(3), 202-227. Kop, R. (2011). The challenges to connectivist learning on open online networks: Learning experiences during a massive open online course. International Review of Research in Open and Distance Learning, 12(3). 19-38. Ito, M., Gutiérrez, K., Livingstone, S., Penuel, B., Rhodes, J., et al. (2013). Connected Learning: An Agenda for Research and Design. Irvine, CA: Digital Media and Learning Research Hub. DCF: Pg. 255-264 (Shaping Learning Online for Making and Sharing Children's DIY Media) **Optional Readings (To be Used for Class Presentations):**

	Yuan, L., & Powell, S. J. (2013). MOOCs and open education: Implications for higher education. Walker, J., Slater, S., & Kafai, Y. (2019). A Scaled Analysis of How Minecraft Gamers Leverage YouTube Comment Boxes to Participate and Collaborate. Hew, F., & Cheung, W. (2014). Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges. Educational Research Review, 12, 45-58. **Due (date): Initial Discussion Board Post (10/7), Discussion Facilitator and Summary Presentation #4 (10/5)**
10/12	**Topic: Learning Contexts: Computer Science Education** Format: Asynchronous **Required Readings:** Papert, S., Solomon, C., Soloway, E., & Spohrer, J. C. (1971). Twenty things to do with a computer. Studying the novice programmer, 3-28. Jiang, S., Lee, V. R., & Rosenberg, J. M. (2022). Data science education across the disciplines: Underexamined opportunities for K-12 innovation. British Journal of Educational Technology. Lee, V. R., Pimentel, D. R., Bhargava, R., & D'Ignazio, C. (2022). Taking data feminism to school: A synthesis and review of pre-collegiate data science education projects. British Journal of Educational Technology. DCF: Pg. 31-38 (Playgrounds and Microworlds: Learning to Code in Early Childhood) **Optional Readings (To be Used for Class Presentations):** Strawhacker, A., & Bers, M. U. (2015). "I want my robot to look for food": Comparing Kindergartner's programming comprehension using tangible, graphic, and hybrid user interfaces. International Journal of Technology and Design Education, 25(3), 293-319. **Due (date): Theorizing Practice Paper (10/12), Initial Discussion Board Post (10/14)**
10/19	**Topic: Learning Contexts: Life Science Education** Format: Asynchronous **Required Readings:** Dabholkar, S. Designing Emergent Systems Microworlds to learn computational thinking in the context of synthetic biology. Kafai, Y. B. (2020). Twenty Things to Make with Biology. Proceedings of Constructionism 2020. Kafai, Y. B., & Walker, J. T. (2020, April). Tools for Biomakers: Reviewing Affordances and Challenges for K-12 Hands-On Making with Biology. In Proceedings of the FabLearn 2020-9th Annual Conference on Maker Education (pp. 10-17).

	Optional Readings (To be Used for Class Presentations): Kafai, Y. B., & Walker, J. T. (2020). Bringing 21st-century science into schools. Phi Delta Kappan, 102(1), 38-41. **Due (date): Initial Discussion Board Post (10/21)**
10/26	**Topic: Video Games and Virtual Worlds Part** **Format: In Person** **Required Readings:** Dunleavy, M. (2014). Design principles for augmented reality learning. TechTrends, 58(1), 28–34. Shaffer, D. W., Squire, K. R., Halverson, R., & Gee, J. P. (2005). Video games and the future of learning. Phi delta kappan, 87(2), 105-111. DCF: Pg 349-359 (Constructionist Learning Games in School) **Optional Readings (To be Used for Class Presentations):** Strawhacker, A., Kafai, Y., T. Giang, M., Fields, D., & Tofel-Grehl, C. (2021, June). Designing the Virtual SPIKEY-20 Epidemic: Engaging Youth in Seeking Information and Using Personal Protection. In Interaction Design and Children (pp. 558-562). **Due (date): Initial Discussion Board Post (10/28), Discussion Facilitator and Summary Presentation #5 (10/26)**
11/2	**Topic: Learning Contexts Math Education** Format: Asynchronous **Required Readings:** Remillard, J. T., & Heck, D. J. (2014). Conceptualizing the curriculum enactment process in mathematics education. Zdm, 46(5), 705-718. Remillard, J. T., & Heck, D. J. (2014). Conceptualizing the enacted curriculum in mathematics education. Enacted mathematics curriculum: A conceptual framework and research needs, 121-148. Pape, S. J., & Tchoshanov, M. A. (2001). The role of representation (s) in developing mathematical understanding. Theory into practice, 40(2), 118-127. **Due (date): Initial Discussion Board Post (11/4)**
11/9	**Topic: Constructionism and Maker Education** **Format: In Person** **Required Readings:**

	Vossoughi, S., Hooper, P. K., & Escudé, M. (2016). Making through the lens of culture and power: Toward transformative visions for educational equity. Harvard Educational Review, 86(2), 206-232. Sheridan, K., Halverson, E. R., Litts, B., Brahms, L., Jacobs-Priebe, L., & Owens, T. (2014). Learning in the making: A comparative case study of three makerspaces. Harvard Educational Review, 84(4), 505-531. Resnick, M., Maloney, J., Monroy-Hernandez, A., Rusk, N., et al. (2009). Scratch: programming for all. Communications of the ACM, 52(11), 60-67. DCF: Pg. 301-310 (Hi-Lo Tech Crafting: Tinkering with Textiles, Paper and Everything Else) **Optional Readings (To be Used for Class Presentations):** Fields, D. A., Kafai, Y. B., Morales-Navarro, L., & Walker, J. T. (2021). Debugging by design: A constructionist approach to high school students' crafting and coding of electronic textiles as failure artifacts. British Journal of Educational Technology, 52(3), 1078-1092. Litts, B. K., Lui, D. A., Widman, S. A., Walker, J. T., & Kafai, Y. B. (2017). Science Lab as Maker Studio: Creating and Critiquing Electronic Textiles in High School Class. **Due (date): Initial Discussion Board Post (11/11), Discussion Facilitator and Summary Presentation #6 (11/9)**
11/16	**Topic: Technology in Informal Learning Environments** **Format: In Person** **Required Readings:** Obiorah, M. G. S., Hammerman, J. K., Rother, B., Granger, W., West, H. M., Horn, M., & Trouille, L. (2021, May). U! Scientist: Designing for People-Powered Research in Museums. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (pp. 1-14). Martin, K., Horn, M., & Wilensky, U. (2021). Constructivist Dialogue Mapping: A Comparison of Museum Experience. In Proceedings of the 15th International Conference of the Learning Sciences-ICLS 2021.. International Society of the Learning Sciences. DCF: Pg. 159-166 (Jeitismo Construcionismo in Brasilian Learning Communities) **Optional Readings (To be Used for Class Presentations):** Yoon, S. A., & Wang, J. (2014). Making the invisible visible in science museums through augmented reality devices. TechTrends, 58(1), 49-55. Zhao, L., & Horn, M. (2021). MineArt: Active Prolonged Engagement through Participatory Exhibits in Art Museums. In Proceedings of the 15th International Conference of the Learning Sciences-ICLS 2021.. International Society of the Learning Sciences.

	Zimmerman, H.T. & Land, S.M. (2014). Facilitating place-based learning in outdoor informal environments with mobile computers. TechTrends, 58(1), 77–83. Yoon, S. A., Elinich, K., Wang, J., Schooneveld, J. B., & Anderson, E. (2013). Scaffolding Informal Learning in Science Museums: How Much Is Too Much? *Science Education*, *97*(6), 848-877. Sharples, N. & Pea, R.D. (2014). Mobile learning. In: Sawyer, R. K. (Ed.). *The Cambridge Handbook of the Learning Sciences*. (pp. 1513-1573). New York: Cambridge University Press. **Due (date): Initial Discussion Board Post (11/18), Discussion Facilitator and Summary Presentation #7 (11/16), Discussion Facilitator and Summary Presentation #8 (11/16)**
11/23	**Topic: Activity Systems and Theory** Format: Asynchronous **Required Readings:** Collins, A. & Halverson, R. (2009). Conclusion. In Rethinking Education in the Age of Technology: The Digital Revolution and the Schools. New York: Teachers College Press. Kain, D., & Wardle, E. (n.d.). Activity theory: An introduction for the writing classroom. Retrieved from https://writing.opencourse.stedwards.edu/resources/activity-theory-introduction-writing-classroom. Greeno, J., & Engestrom, Y. (2014). Learning in activity. In K. Sawyer (ed.), The Cambridge Handbook of the Learning Sciences, (pp. 128-147). New York: Cambridge University Press. **Due (date): Design of Learning Environment/Research Intervention/Theoretical Framework (11/23), Initial Discussion Board Post (11/28)**
11/30	**Topic: Assessment** Format: Asynchronous **Required Readings:** Darling-Hammond, L., Adamson, F. (2013). Developing assessments of deeper learning: The costs and benefits of using tests that help students learn. Stanford, CA: Stanford University, Stanford Center for Opportunity Policy in Education. Davidson, C. (2011). How we measure. In Now you see it (pp. 105-131). New York, NY: Viking Penguin. Clarke-Midura, J., Dede, C. (2010). Assessment, technology, and change. Journal of Research on Technology in Education, 42(3), 309-328. **Due (date): ALL Discussion Board Posts (12/2)**