

**EDUC 8730 Advanced Qualitative Analysis:  
Purposes and Methods of Design Research**

Bill Penuel, Instructor

*Tuesdays, 8:15-10:45 am*

*Room: Miramontes-Baca Education 170*

*Office Hours: By Appointment on <https://calendly.com/bpenuel/1-on-1-meeting>*

**COURSE SYLLABUS FOR FALL 2025**

**Course Overview**

Design research is an approach to research in which people “build to think” and “think to build.” It draws together insights, theories, and methods from multiple disciplines, from anthropology to cognitive science to human-computer interactions. It aims to create practical innovations, new theories of learning and design, and knowledge about expanded possibilities for learning. Design research is used to develop and study a wide range of innovations, from curriculum materials to organizational routines to public spaces.

This seminar explores design research as a historically evolving family of approaches to organizing research and development to imagine new possibilities for learning. Together, we will explore:

- Historical roots of design research
- Objects of design, including curriculum, local instruction theories, learning environments, professional development, and organizational routines
- The theories that inform design research
- Practical tools for participatory approaches to design research
- Approaches to analysis of design research (e.g., case analyses, critical perspectives)
- Examples of successful partnerships with youth, educators, and communities that employ design research

**Learning Goals for Course**

At the conclusion of the course, you will be prepared to:

- Develop a research and development process and situate it within the range of design research purposes that exist
- Develop an initial local instruction theory and locate it within research on how people learn
- Justify methods to (1) investigate a context prior to design and (2) refine, test, or critically analyze who benefits and who is harmed by enactment of the local instruction theory
- Develop a plan for iterative, collaborative refinement of a design that considers the power and positionality of participants (including oneself)

## **Building and Maintaining a Caring Classroom Community**

In this class, as in every class, there is an opportunity for us to engage fully with one another and with the material, if we can stay with difficulties and discomfort that arise for us, speak our truth, and accept and embrace non-closure when it comes to matters of race, class, gender and sexual identity, language, our different abilities, and many other identities that may be important to members of the class. For us to stay engaged with each other, we need to take care in our interactions with one another and consider the potential and real impact of our words and actions on others, not just our intent. We need to notice participation patterns in the classroom and work together to transform them if they need to. We can also acknowledge that we are in the midst of multiple political and climate crises that are affecting different members of this class in ways that could be both visible and invisible to others. With all these considerations, let us strive to treat one another with kindness and compassion, without confusing kindness and niceness, when it comes to facing difficulty and discomfort.

I expect everyone to participate in classroom discussions and activities, as a speaker, listener, and doer. I encourage you to pose questions, make and defend claims, and share stories of relevant personal experience in design research. I ask that you speak respectfully of others (including authors of texts) and avoid stereotyping groups of others. When talking about something we are reading, seek first to identify the purpose of the work and its constructive contribution, before offering a critique. When listening, please accord respect to other course members by signaling that their contributions are worthy of your consideration and asking questions to understand their ideas. Please do not use chat or social media at any time during class to communicate with others inside or outside the class.

I will begin this class introducing a set of community agreements established collectively at the Renée Crown Wellness Institute, and we will iterate on these together and review how we are doing with them on a regular basis. These agreements are intended to help us meet the expectations outlined above and to create a “safe enough” container for us to explore deep ideas and practices together with open minds and hearts.

## **A Note about the Workload for this Course**

I have assigned a lot of reading in the class. I recognize that you may not be able to do all of the reading with the same level of depth. Your success will depend on your skill in targeting your reading to understand the logic of the arguments and consider issues most directly relevant to course material, as well as re-reading texts and passages that are directly relevant to your interests and project in the class.

In addition, the heaviest workload is likely up front, especially when researching the theoretical and empirical basis for your conjecture map. The more up front work you put in to your conjecture map, the easier it will be to iterate on your project, as it will help you situate your proposed study within the broader field.

## **Feedback and Grading**

You can expect detailed written feedback on your work from me for each of the assignments. My feedback is likely to be both critical and constructive, designed to help

you develop a compelling plan for design research study. Also, I give a lot of feedback: the amount of feedback you receive will not be a reliable indicator of your grade.

My expectation is that graduate students will all do “A-level” work. You can earn an A by attending every class, participating actively and respectfully in class, completing all assignments on time, thoughtfully including ideas from readings and class discussion in assignments, and showing evidence of incorporating feedback in your revisions. If you know you must miss class, let me know at least one week in advance.

### **Using Canvas and Google Drive**

All readings will be in Canvas, and all assignments should be submitted to Canvas. We will use Google Drive for classroom activities, and all class slides will be in our shared Google Drive. You can access that Drive at: <https://tinyurl.com/CUDBRFall2025>

### **Office Hours**

I am available by appointment; please sign up through my [Calend.ly link](#). Though my travel schedule is active, I am available via email for a response within 24 hours, except on weekends.

### **Key Assignments**

All assignments should be submitted to Canvas. Most of the assignments are components of the final course project, in which you will choose to write a proposal for a design research project or the methods section for a design research paper. Due dates are as follows:

- 9/14 by class time: 1-page overview of design research plan/proposal
- 9/28 by class time: Learning trajectory or conjecture map
- 10/12 by class time: Case analysis and presentation
- 11/9 by class time: Strategy for learning about context
- 11/16 by class time: Description of design process
- 12/7 by class time: Research plan and workshop
- 12/13 by 5pm: Final draft of proposal or methods section

### ***FINAL PRODUCT CHOICE 1: Research and Development Plan for a Grant***

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You will develop a 7- to 8-page (single-spaced) research and development plan for a design-based research or design-based implementation research study that would be the centerpiece of a proposal to one of the following five programs or one of your choosing (with my approval):

*Spencer Foundation Small Research Grants*

[https://www.spencer.org/grant\\_types/small-research-grant](https://www.spencer.org/grant_types/small-research-grant)

*Spencer Foundation Research-Practice Partnerships: Collaborative Research for Educational Change*

[https://www.spencer.org/grant\\_types/research-practice-partnerships](https://www.spencer.org/grant_types/research-practice-partnerships)

*William T. Grant Foundation: Reducing Inequality Grants*

<https://wtgrantfoundation.org/funding/research-grants-on-reducing-inequality>

You are asked to develop only that portion of the required proposal narrative for your chosen program that specifies:

- The larger aim of the research (e.g., develop theory, test design principles)
- The specific research questions you will address
- Conjectures you plan to investigate and claims you expect to be able to support with evidence at the conclusion of the study
- A conjecture map or learning trajectory and text description of the local instructional theory that underlies the map/trajectory
- A strategy for learning about the context before engaging in design (e.g., initial observations of the context, development of partnerships, understanding and specifying partners' goals)
- A description of the design process, including junctures where you plan to iterate upon the design and the basis for the iteration (e.g., in what way will you review data and make adjustments during the implementation of the design? On what time scales?)
- Sources of data to be collected (e.g., focused observations, interviews, video collected)
- Retrospective analysis (e.g., what data will you review? How will you sample from your data? Will you use existing measures/coding schemes or develop new schemes?)

**Models.** Some models of a DBR research plan are included in Canvas.

**Group vs. Individual Work.** You may work in pairs, small groups (up to 4 people), or on your own for this assignment. I encourage you to work in small groups, since that will give you an experience that is similar to most design-based research projects.

**Format and tailor your proposal according to the requirements of your funder.**

Write as you would for an audience that includes both people who are familiar with

theory relevant to your domain and those who receive funding from the organization but who may not be familiar with your specific area of research.

### ***CHOICE 2: Methods Section for Dissertation Proposal or Research Paper***

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You will prepare an expanded methods section for a dissertation proposal or publishable paper, based on research that you are already working on. The methods section should be for a design research study.

Your paper should include:

- A brief introduction to the methods section, including a description of
  - The kind of project you are working on and for what purpose (e.g., dissertation, a manuscript for a journal)
  - The problem, relevant background, and your research goals.
  - Your research questions

Your paper should then be written as a methods section that addresses the following areas and describes your rationale for the choices you make in relation to each:

- Your research site(s) and participants
- A strategy for learning about context before engaging in design (e.g., initial observations of the context, development of partnerships, understanding and specifying partners' goals)
- A conjecture map or learning trajectory and text description of the local instructional theory that underlies the map/trajectory
- Sources of data collected (e.g., focused observations, interviews, video collected)
- A description of the design process, including junctures where you iterated upon the design and the basis for the iteration (e.g., in what way did you review data and make adjustments during the implementation of the design? On what time scales?)
- Retrospective analysis (e.g., What data did you review? How did you sample from your data? Did you use existing measures/coding schemes or develop new schemes?)

**Group vs. Individual Work.** This choice is more likely to be worked on individually or with your research team. If you are working on a shared research project with another class member and plan to write about it together, you are welcome to work together.

**Format.** If you choose this assignment, your paper should be 12-15 double-spaced pages. Write as you would for an academic audience in your field: the paper should be a slightly expanded version of what you would submit for a journal. You should follow the formatting guidelines appropriate for the venue you will submit the paper to. If the submission is for a journal, use [APA 7th Edition formatting guidelines](#).

## *Intermediate Assignments*

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To provide you with time to develop and refine your ideas over the course of the semester, I have designed several intermediate assignments. Each assignment will help you build your research plan. **You are expected to revise the previous assignment based on feedback I provide you and include it with your next assignment and to revise your one-page overview as you go.**

You may decide and are even encouraged to change anything and everything in your plan at any point in time during the course, if warranted by feedback or a change in your own thinking.

**Initial 1-Page Proposal/Plan Overview (Due: 9/16, by class time).** This assignment should provide a reader with an overview of your proposed study “as a whole.” It should be revised each time you submit another section of your proposal or plan. The overview should include:

- Purpose
- Identify 1-3 research questions
- Setting for research
- Approach to design
- Data to be collected
- Approach to analysis
- Contribution to the field

**Aims and Conjecture Map (Due: 9/30, by class time).** In this assignment, you will specify initial conjectures and create a conjecture map.

A *conjecture* expresses an investigator’s initial idea about how to support learning in a particular domain. In design research, one “embodies” these conjectures in a *conjecture map* in order to investigate them. Developing a conjecture map requires investigators to define some immediately visible consequences from participants’ interaction with the design (intermediate outcomes) and some claims about learning that can be empirically tested (long-term outcomes).

Your draft should specify the research questions you hope to address and the conjectures you will investigate as part of the study.

The map should include: a graphical representation of the key tools, materials, and activity structures that embody the conjectures, mediating processes, and outcomes (claims)

Accompanying the map, develop a text description that describes the key elements of the design (embodiment) and explains how and why each element is conjectured to lead to one or more mediating processes. You should also say how the mediating processes are expected to produce the outcome. A good text description will present a mix of theoretical and empirical support for the inclusion of each component of your initial design. To find theoretical and empirical support, it is useful to consult relevant

handbook chapters, theoretical syntheses, and meta-analyses. I have included several of these in Canvas that are relevant to topics of interest to students in the class.

**Case Analysis and Presentation Assignment (Due 10/14, by class time).** For this analysis, you will work with a team of people (3-4) to develop an analysis of a series of studies related to a single educational innovation that has been developed and refined over the course of several design studies.

You will present your analysis in the form of a “scripted,” 10-minute PowerPoint presentation to the class. By “scripted,” you should write ahead of time what you will say and organize the presentation so that it answers the questions below. At the conclusion of the presentation, you should pose some questions for the class to discuss about the work you have presented (10 minutes’ worth).

You may organize the sequence of slides and presentation any way you wish. Assume that your classmates will not have read the articles, so give them enough context to contribute to the discussion productively at the conclusion of your presentation.

- Who developed the innovation(s), and using what process?
- What is the scope of the design of the innovation? What are the key elements and how do they work together to support learning?
- How do the studies both build upon one another and depart from what’s gone before?
- What key challenges or critiques do the authors appear to be considering and addressing over time? What tools do they use to address these challenges?
- In your view, does this the body of work—taken as a whole—make a significant contribution to our understanding of how people learn? If so, why? If not, why not?

**Strategy for Learning about the Context (Due: 11/11).** Participatory design typically includes “up front” research to learn about the context of design. Elements of context include details about learners, their current practices and understandings relevant to the domain under study, and the settings where they live and learn.

In this assignment, you will describe a strategy for learning about participants before beginning design that specifies:

- The participants in your setting (who are they)
- What you already know about participants’ concerns, strengths, and needs (and how you know, such as from past research)
- What you need to learn about with respect to participants, their current practices and understanding, and their contexts
- How you will go about learning about it
- How what you learn will inform what you design, how you will organize the design process, or both

**Description of the Design Process (Due: 11/18, by class time).** Drawing on readings and discussion from class about design, describe the process you will use for design. Your design process should specify:

- Who will participate in design and how
- Junctures in the research and development process where you plan to iterate
- What you will consider (e.g., criteria such as learning outcomes, equitable participation in class) when deciding how/what to revise in your design

**Research Plan and Workshop (Due: 12/2, by class time).** In this assignment, you will develop a research plan that will allow you to develop evidence needed to test specific claims in your research.

The research plan should describe:

- Plan for enactment, including for daily “debriefs” or reflections
- Sources of evidence and plan for data collection
- Plan for retrospective data analysis and refinement of conjectures (if appropriate)

For the workshop, prepare 1-2 slides for each of the key elements of your proposal, including purpose, questions, conjecture map, and the elements described above.

**Final Revised Proposal/Methods Section (Due: 12/9, by 5pm).** Submit final revised versions of proposal/methods section



## Readings by Week

All readings should be completed by the time you come to class, so that we can have a rich discussion informed by those readings. All readings are available in Canvas.

### ***Origins***

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August 26, 2025

Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *The Journal of the Learning Sciences*, 2(2), 141–178. [https://doi.org/10.1207/s15327809jls0202\\_2](https://doi.org/10.1207/s15327809jls0202_2)

Penuel, W. R., Cole, M., & O'Neill, D. K. (2016). Introduction to the special issue. *Journal of the Learning Sciences*, 25(4), 487–496. <https://doi.org/10.1080/10508406.2016.1215753>

### ***Purposes***

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September 2, 2025

Bang, M., & Vossoughi, S. (2016). Participatory design research and educational justice: Studying learning and relations within social change making. *Cognition and Instruction*, 34(3), 173–193. <https://doi.org/10.1080/07370008.2016.1181879>

Bakker, A. (2018). *Design research in education: A practical guide for early career researchers*. New York, NY: Routledge. Chapter 4: Research questions in design research.

Rajala, A., Cole, M., & Esteban-Guitart, M. (2023). Utopian methodology: Researching educational interventions to promote equity over multiple timescales. *Journal of the Learning Sciences*, 32(1), 110–136. <https://doi.org/10.1080/10508406.2022.2144736>

In-class activity: [Inventory of Participatory Design Experiences](#)

### ***What Makes Something a Design Study, Part 1***

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September 9, 2025

Read three of these four articles:

Barajas-López, F., & Bang, M. (2018). Indigenous making and sharing: Claywork in an Indigenous STEAM program. *Equity & Excellence in Education*, 51(1), 7-20. <https://doi.org/10.1080/10665684.2018.1437847>

Tian, Z., & Shepard-Carey, I. (2020). (Re)imagining the future of translinguaging pedagogies in TESOL through teacher-researcher collaboration. *TESOL Quarterly*, 54(4), 1131-1143. <https://doi.org/10.1002/tesq.614>

Jones, S. T., Thompson, J., & Worsley, M. (2020). Data in motion: Sports as a site for expansive learning. *Computer Science Education*, 30(3), 279–312.  
<https://doi.org/10.1080/08993408.2020.1805287>

Penuel, W. R., O'Connor, K., Allen, A.-R., Jacobs, J., & Lo, A. S. (2024). Examining science teachers' conceptions of student interest as a consideration in designing assessments. *Journal of Science Teacher Education*.  
<https://doi.org/10.1080/1046560X.2024.2435747>

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### ***What Makes Something a Design Study, Part II***

*September 16, 2025*

Cobb, P. A., Confrey, J., diSessa, A. A., Lehrer, R., & Schauble, L. (2003). Design experiments in educational research. *Educational Researcher*, 32(1), 9–13.  
<https://doi.org/10.3102/0013189X032001009>

Gutiérrez, K. D., Jurow, A. S., & Vakil, S. (2020). Social design-based experiments: A utopian methodology for understanding new possibilities for learning. In N. S. Nasir, C. D. Lee, R. Pea, & M. McKinney de Royston (Eds.), *Handbook of the cultural foundations of learning* (pp. 330–347). Routledge.  
<https://doi.org/10.4324/9780203774977-23>

Plus: Read a design study that is pertinent to your field (you may use the studies in the Canvas folder or find one yourself) and consider what makes it a design study. Prepare 1-2-page summary of the article you chose that addresses the following: What is the researchers' purpose? What are the key claims? What are the grounds (data) for the claims? How well do the data support the claims?

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### ***Design as a Form of Research***

*September 23, 2025*

Mehan, H. (2008). Engaging the sociological imagination: My journey into design research and public sociology. *Anthropology & Education Quarterly*, 39(1), 77-91.  
<https://doi.org/10.1111/j.1548-1492.2008.00006.x>

Sandoval, W. A. (2014). Conjecture mapping: An approach to systematic educational design research. *The Journal of the Learning Sciences*, 23(1), 18–36.  
<https://doi.org/10.1080/10508406.2013.778204>

Hoadley, C., & Campos, F. (2022). Design-based research: What it is and why it matters to studying online learning. *Educational Psychologist*, 57(3), 207–220.  
<https://doi.org/10.1080/00461520.2022.2079128>

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## ***Mid-Range Theories for Design-Based Research***

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September 30, 2025

Read the first article and choose **two** others from list:

All read: National Academies of Sciences Engineering and Medicine. (2024). *Equity in preK-12 STEM education: Framing decisions for the future*. National Academies Press. <https://doi.org/10.17226/26859> Chapter 6: Approaches to Equity through the Lens of Decision Making: Five Frames

Mirra, N., & Garcia, A. (2020). “I hesitate but I do have hope”: Youth speculative civic literacies for troubled times. *Harvard Educational Review*, 90(2), 295–321. <https://doi.org/10.17763/1943-5045-90.2.295>

Louis, V. N., & King, N. S. (2022). Emancipating STEM education through abolitionist teaching: A research-practice partnership to support virtual microteaching experiences. *Journal of Science Teacher Education*, 33(2), 206–226. <https://doi.org/10.1080/1046560X.2021.2012957>

Manz, E., Heredia, S. C., Allen, C. D., & Penuel, W. R. (2022). Learning in and through researcher-teacher collaboration. In G. Jones, J. A. Luft, & T. R. Tretter (Eds.), *Handbook of Science Teacher Education* (pp. 452-464). Routledge. <https://doi.org/10.4324/9781003098478-40>

Meixi, Moreno-Dulcey, F., Alcalá, L., Keyser, U., & Elliott-Groves, E. (2022). When learning is life giving: Redesigning schools with Indigenous systems of relationality. *AERA Open*, 8(1), 1-16. <https://doi.org/10.1177/23328584211062587>

Zeller, L., Anderson, E. R., Salvage, A., & Hofman, D. (2024). Analyzing and designing for sustained organizational change. In R. Lindgren, T. Asino, E. A. Kyza, C. K. Looi, D. T. Keifert, & E. Suárez (Eds.), *Proceedings of the 18th International Conference of the Learning Sciences - ICLS 2024* (pp. 91–98). International Society of the Learning Sciences. <https://doi.org/10.22318/icls2024.134087>

In class activity: [For Whom Are We Designing?](#)

## ***Small Theories for Design-Based Research***

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October 7, 2025

Choose **three** of the four articles below:

Jurow, A. S., & Freeman, Q. (2020). Re-mediating designs for equity: Making commitments concrete. *Information and Learning Sciences*, 121(9/10), 711–728. <https://doi.org/10.1108/ILS-01-2020-0003>

Ribay, K. (2024). Lessons from a professional learning community: Navigating tensions while moving between theory and practice in teaching chemistry for social justice. *Science Education*, 108(3), 734–761. <https://doi.org/10.1002/sce.21854>

Teeters, L. P., Shedro, M., Alvarez, A., Schultz, K., Gleason, E., Zigarelli, J. C., & Trejo, B. (2023). Circles de *confianza*: Using multimodal testimonios to build culturally sustaining schools. *Ethnography and Education*, 18(4), 356–375.

<https://doi.org/10.1080/17457823.2023.2252547>

Champion, D., Solomon, F., & Lammey, M. (2025). Dance-making as a culturally sustaining dialogic practice for physics learning and assessment. *Journal of the Learning Sciences*.

In class activity: Reconstructing a conjecture map from a narrative description

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### ***Case Study Analyses and Presentations, Part I***

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October 14, 2025

Work with small group to review articles (in Canvas folders) related to one of the following:

- Bang: American Indian Center Partnership/Learning in Places
- Compose Our World (COW)
- MLL Partnership
- Problem Solving Cycle
- Chicago City of Learning/Digital Youth Divas

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### ***Case Study Analyses and Presentations, Part II***

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October 21, 2025

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### ***Tools: Building Partnerships***

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October 28, 2025

McWilliams, J. (2016). Queering participatory design research. *Cognition and Instruction*, 34(3), 259–274. <https://doi.org/10.1080/07370008.2016.1172436>

Oyewole, K. A., Karn, S. K., Classen, J., & Yurkofsky, M. (2023). Equitable research-practice partnerships: A multilevel reimagining. *The Assembly*, 5(1), 40–59. <https://journals.colorado.edu/index.php/assembly/article/view/1531>

Riedy, R., & Penuel, W. R. (2024). Dignity-affirming care in research-practice partnerships. *Peabody Journal of Education*, 99(3), 259–273. <https://doi.org/10.1080/0161956X.2024.2357008>

In class activities: [Circles of My Multicultural Self](#) (Positionality); [Composing a Team: Considering Power and Process](#)

## ***Tools: Organizing for Co-Design***

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November 4, 2025

Read the first article and choose **two** others from list:

All read: Brandt, E., Binder, T., & Sanders, E. B.-N. (2013). Tools and techniques: Ways to engage telling, making, and enacting. In J. Simonsen & T. Robertson (Eds.), *Routledge International Handbook of Participatory Design* (pp. 145-181). London, UK: Routledge. <https://doi.org/10.4324/9780203108543-8>

Bal, A., Afacan, K., Clardy, T., & Cakir, H. I. (2021). Inclusive future making: Building a culturally responsive behavioral support system at an urban middle school with local stakeholders. *Cognition and Instruction*, 39(3), 275–305. <https://doi.org/10.1080/07370008.2021.1891070>

Ishimaru, A. M., & Bang, M. (2022). Solidarity driven co-design: Evolving methodologies for expanding engagement with familial and community expertise. In D. J. Peurach, J. L. Russell, L. Cohen-Vogel, & W. R. Penuel (Eds.), *The foundational handbook of improvement research in education* (pp. 383-402). Rowman & Littlefield.

Chang, M. A., Wong, R., Breideband, T., Philip, T. M., McKoy, A., Cortez, A., & D'Mello, S. K. (2024). Co-design partners as transformative learners: Imagining ideal technology for schools by centering speculative relationships. In F. Mueller, P. Kyburz, J. Williamson, C. Sas, I. Shklovski, P. T. Dugas, & M. L. Wilson (Eds.), *CHI '24: Proceedings of the CHI Conference on Human Factors in Computing Systems* (pp. 1–15). Association for Computing Machinery. <https://doi.org/10.1145/3613904.3642559>

Potvin, A., Teeters, L. P., Penuel, W. R., & Dimidjian, S. (2024). Humanizing co-design through attention to educators' affective and relational experiences. *Journal of the Learning Sciences*, 33(1), 41–79. <https://doi.org/10.1080/10508406.2024.2318557>

## ***Tools for Data Collection and Analysis: Studying While Designing***

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November 11, 2025

Johnson, R., Severance, S., Penuel, W. R., & Leary, H. A. (2016). Teachers, tasks, and tensions: Lessons from a research-practice partnership. *Journal of Mathematics Teacher Education*, 19(2), 169-185. <https://doi.org/10.1007/s10857-015-9338-3>

Takahashi, S., Sandoval, C., Jackson, B., Cunningham, J., & Taylor, C. (2025). Practical measurement for equity and justice. *Frontiers in Education*, 9, 1–16. <https://doi.org/10.3389/educ.2024.1442505>

Weddle, H., Hopkins, M., & Goldstein, H. (2024). How can research-practice partnerships advance multilingual learner equity? A case study of partnership with State Education Agency Leaders. *Peabody Journal of Education*, 99(3), 345–362. <https://doi.org/10.1080/0161956X.2024.2357036>

### ***Tools for Data Collection and Analysis: Retrospective Analysis***

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November 30, 2025

Read the first article and choose two others from list:

All read: Langer-Osuna, J. M. (2016). The social construction of authority among peers and its implications for collaborative mathematics problem solving. *Mathematical Thinking and Learning*, 18(2), 107-124.

<https://doi.org/10.1080/10986065.2016.1148529>

Jurow, A. S., Hall, R., & Ma, J. Y. (2008). Expanding the disciplinary expertise of a middle school mathematics classroom: Re-contextualizing student models in conversations with visiting specialists. *The Journal of the Learning Sciences*, 17(3), 338-380. <https://doi.org/10.1080/10508400802192714>

Marin, A. (2020). Ambulatory sequences: Ecologies of learning by attending and observing on the move. *Cognition and Instruction*, 38(3), 281-317.

<https://doi.org/10.1080/07370008.2020.1767104>

Yankova, N., & Peppler, K. (2025). Beyond the binary: Leaning on materials-to-queer-with in the ‘doing of mathematics’. In A. Rajala, A. Cortez, R. Hofmann, A. Jornet, H. Lotz-Sisitka, & L. Markauskaite (Eds.), *Proceedings of the 19th International Conference of the Learning Sciences - ICLS 2025* (pp. 3130–3132). International Society of the Learning Sciences. <https://doi.org/10.22318/icls2025.525574>

### ***Putting Things Together***

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December 7, 2025

Opportunity to workshop “puzzles of design and research” with peers in class

## **Honor Code**

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [Honor Code](#). Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part in adhering to the Honor Code.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: [StudentConduct@colorado.edu](mailto:StudentConduct@colorado.edu). Students found responsible for violating the [Honor Code](#) will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Visit [Honor Code](#) for more information on the academic integrity policy.

## **Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation**

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or [DSinfo@colorado.edu](mailto:DSinfo@colorado.edu) for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

If you have a temporary illness, injury or required medical isolation for which you require adjustment, please contact me to let me know to make arrangements that fit your circumstances. You are not required to disclose the nature of any illness when alerting me about the need for some accommodation to meet your needs for well-being.

## **Accommodation for Religious Obligations**

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please communicate the need for a religious accommodation in a timely manner. In this class, I will make every effort to accommodate all students who have such conflicts with scheduled examinations, assignments, or attending class, provided students notify me well in advance of the scheduled conflict. In this class, you must inform me of any conflicts with religious observances 2 weeks before an assignment is due or 2 weeks before you must miss class. I will adjust due dates of assignments so as not to interfere with your religious obligations.



## **Classroom Behavior**

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

For more information, see the [classroom behavior policy](#), the [Student Code of Conduct](#), and the [Office of Institutional Equity and Compliance](#).

## **Preferred Student Names and Pronouns**

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

## **Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation**

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits [protected-class](#) discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email [CUreport@colorado.edu](mailto:CUreport@colorado.edu). Information about university policies, [reporting options](#), and [OIEC support resources](#) including confidential services can be found on the [OIEC website](#).

Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure that individuals impacted receive outreach from OIEC about their options and support resources. To learn more about reporting and support for a variety of concerns, visit the [Don't Ignore It page](#).

## **Mental Health and Wellness**

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact [Counseling and Psychiatric Services \(CAPS\)](#) located in C4C or call (303) 492-2277, 24/7.



Free and unlimited telehealth is also available through [Academic Live Care](#). The Academic Live Care site also provides information about additional wellness services on campus that are available to students.

### **Acceptable Use of AI in this Class**

I view Generative AI as tools that are important for all students to understand and that students can choose to use to support their work. I encourage exploration of these tools, particularly as they become integral parts of society and the work of educational research. As with all tools we use to build and communicate knowledge, they have potential benefits and can cause harm. It is my view that understanding Generative AI as a tool for work is as essential as developing facility with other digital tools we have used now for decades to conduct both qualitative and quantitative analysis.

You may use Generative AI (tools like Claude, ChatGPT, or DeepSeek) in any way you wish. However, you must disclose how you used the tools, and if you use these tools to generate—rather than edit—new text, you must describe how you evaluated the output of the text for accuracy.

When considering using Generative AI as part of this class, I invite you to learn about and consider the potential harms of Generative AI, including environmental impacts of their use (each search uses 10x the amount of electricity as a single web search that does not use AI); the fact that many texts used to train models within systems have not been obtained lawfully through proper copyright; the absence of transparency regarding AI models; and the possible biases that are part of every aspect of AI systems due to who trained them, how they were trained, and how accessible the most powerful models are to different communities and groups.