

**EDUC 9737: CONTEMPORARY ISSUES IN CURRICULUM AND INSTRUCTION:
DESIGN OF LEARNING ENVIRONMENTS IN THE LEARNING SCIENCES
Fall 2015
Mondays 4:30 – 6:50, Fulton Hall, Room 210**

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COURSE WEBSITE

Readings and materials for the course are available on Canvas.

COURSE OVERVIEW

The design of learning environments (e.g. curriculum, technology tools, professional development, museum exhibits) and individuals' experiences within those environments significantly impact both teacher and student learning. The learning sciences is an interdisciplinary field of research that draws from a variety of domains such as cognitive science, educational psychology, sociology and education to design effective learning and teaching environments. The goals of the learning sciences are to 1) understand the physical, cognitive and social aspects of learning environments and 2) use these understandings to design more effective learning environments.

Learning scientists study a variety of environments from formal settings such as schools to informal settings such as museums, jobs and interactions among peers. In this course, we will examine different learning environments as well as various aspects within those environments. For example, we will examine curriculum to evaluate the scaffolds to support student learning, analyze digital learning environments for professional development to support teacher learning and critique video of classroom discourse to examine student interactions and community development. In this course, we will consider the environment both as conceptualized by its designers (the design) and as it is experienced by participants as learning interactions unfold in particular settings (the enactment) to evaluate the effectiveness of those learning environments.

ASSIGNMENTS

Below is a description of the assignments for this class.

Weekly Readings and Class Participation **20%**

You will be expected to read and carefully consider each of the weekly reading assignments and to participate in class discussions of the readings each week. Before each class, you need to post 2 questions regarding the reading on Canvas in the "Discussions" section. These can be either unique questions or they can extend your classmates' questions. Related questions should be posted under the same heading in order to initially group the different lines of questioning. They need to be posted before you go to bed on Sunday night (i.e. before 7am Monday when I will

look at them) so that I can use them to inform our class discussion Monday afternoon. In addition to writing your own questions, you need to review all of the questions submitted by your classmates. Questions are due for Class 2 through Class 10 (9 times total).

If you are unable to attend class, you need to let me know ahead of time and turn in a short written summary of the readings for that class.

Mid-Semester Position Paper **30%**

Using the literature we have explored so far, write a position paper addressing: *What do you think counts and is important in terms of knowledge and knowing for _____ (e.g. pre-service elementary teachers) in the 21st century?* You should specifically discuss knowledge and knowing for your targeted population. Be sure you draw on more than half the literature we have read thus far in the course to make your argument. You should also propose and make a case for possible future directions for educational design and research to better support your targeted population in learning.

- *Describe target population (e.g. pre-service elementary teachers, middle school math students, participants at a science museum exhibit)*
- *Explain what counts as knowledge and knowing for that population supporting your explanation using literature from the class*
- *Argue why you think that knowledge is important for your population supporting your argument using literature from the class*
- *Propose future questions and areas of research to better support this population*

This paper should be no more than 10 pages using 1-1/2 spacing. You may want to include diagrams, concept maps, or other visual representations of your ideas. You must use APA styles for this and all of your papers for this class. The paper is due **Monday, October 26**.

Final Project **50%**

For the final course project, you should choose an option that works best for you. It is appropriate to use this as an opportunity to develop or pilot test materials you may use in your dissertation, conference paper or journal paper. If you are planning to use this project to advance another goal (e.g. dissertation, conference paper, etc.), please let me know so I can focus my feedback accordingly. Options described here include 1) Design a learning environment, 2) Evaluate a learning environment and 3) Literature review. Other options are possible (e.g. develop a grant proposal, design of a research study), but must be cleared in advance by the instructor. Regardless of the format, you will be expected to complete all four phases of the final project.

Four phases of the final project:

- a two-page outline (5%) is due **Monday, November 9**
- an expanded outline (5%) is due **Monday, November 23**
- the class poster fair (10%) is **Monday, December 7**
- the final paper (30%) is due **Monday, December 14**

Final Project Option 1: Design a Learning Environment

For this assignment, you will **design or mock-up a learning environment** (or component of a learning environment), with a specific goal in mind (e.g. development of expertise in pre-service teachers, development of students' abilities to engage in argumentation). You can choose from the suggestions listed below, or propose your own alternative:

- develop curriculum materials or activities to use in a classroom or PD workshop
- develop a technology-mediated learning experience
- develop a text or video case
- develop a syllabus for a class you intend to teach

For this option, your focus should be on describing the theoretical foundations of your design. However, to be successful at doing so, you will need to at least mock-up the learning environment or component. You are welcome to fully develop it, if that makes sense for your situation. Your design must be grounded in the literature we read in class.

Procedure for the design the learning environment paper:

1. Think about, in some detail, the learning environment that you are focusing on. What is the specific goal you are targeting? Explicitly define that goal (e.g. If the goal is to help pre-service teachers develop PCK, define what you mean by PCK). Who is the target audience and what challenges might they face in learning the specific concepts?
2. Now select the key component(s) you will be developing. Gather a set of readings that can serve as foundational research to help guide your design (probably around 10 papers, some from ED9737 and some other resources). Read, review and take notes on these readings. Develop key ideas for your design, including ideas for how your design builds on particular learning theories and research.
3. Outline the design ideas and foundations on which your design will build that will be explored in the paper.
4. Begin to design your learning environment only after careful planning. Make sure you have thought through relevant issues and are grounding your ideas in the literature.
5. Begin to write only after careful planning. Plan for an organized and coherent document through revisions of outlines before you write.

Final Project Option 2: Evaluate a Learning Environment

For this assignment, you will **evaluate** an existing **learning environment** (or component of a learning environment), with a specific goal in mind (e.g. development of expertise in pre-service teachers, development of students' abilities to engage in argumentation). You can choose from the suggestions listed below, or propose your own alternative:

- Evaluate a curriculum or part of a curriculum (e.g. 1 unit in a year long math curriculum)
- Evaluate a digital tool or online learning experience for students
- Evaluate a digital tool or online learning experience for teachers

For this option, you will develop a theoretical argument for 3 criteria that you will use to evaluate the learning environment. Your criteria must be grounded in the literature we read in class. You will then use those 3 criteria to rate the learning environment (e.g. poor, satisfactory, good, excellent), provide specific evidence (e.g. quotes, screen shots, examples) to support that rating and recommendations on how the learning environment could be improved.

Procedure for the evaluate the learning environment paper:

1. Select the learning environment. Think about, in some detail, the learning environment that you are focusing on. What is the specific goal? Explicitly define that goal (e.g. If the goal is to help pre-service teachers develop PCK, define what you mean by PCK). Who is the target audience and what challenges might they face in learning the specific concepts?
2. Develop the 3 criteria that you will use to evaluate the learning environment. Use research to provide a rationale for each criterion (probably around 10 papers, some from ED9737 and some other resources). Read, review and take notes on these readings. Develop key ideas for your criteria, including ideas for how your criteria build on particular learning theories and research.
3. Evaluate the learning environment using the 3 criteria. You may want to use a table or some other structure to support you in this process. You will want to carefully go through the learning environment looking for examples that would either lower or higher your rating for each criteria.
4. Considering your evaluation of the learning environment, you should provide recommendations of how the learning environment could be improved that are grounded in relevant research.
5. Begin to write only after careful planning. Plan for an organized and coherent document through revisions of outlines before you write.

Final Project Option 3: Literature Review

Develop a **literature review** analyzing a trend, issue, or concept relating to the field of the learning sciences. You should develop a question that aligns with your specific interests. For example, here are some possible questions:

- What characteristics of learning environments are essential for supporting _____ (e.g. students, teachers) in _____ (e.g. scientific inquiry, college readiness, expertise in math teaching)?
- How can a curriculum be designed to support students in metacognition?
- What features of an online environment support the development of a _____ (e.g. teacher, student) community?
- What features of scaffolds should be considered to support _____ (e.g. students, teachers) in _____ (e.g. reading, scientific modeling, PCK development)?
- How can teachers design their classrooms to support student discourse?

Procedure for the literature review paper:

1. Choose a particular question or issue that interests you.
2. Using course readings, the references available through the course, and resources such as ERIC, gather a set of approximately 15 papers that discuss your focus topic.
3. Read, review and take notes on these readings. What are some themes or areas of commonality? What are areas of conflict? Where are there holes?
4. Try to determine both the key ideas in the literature, and your own perspective on this topic. Where do your views lie relative to these readings, and why? What evidence or theories support your stance? Be sure to represent your original thinking in your final paper.
5. Begin to write only after careful planning. Plan for an organized and coherent document through revisions of outlines before you write.

FOR ALL 3 OPTIONS:***Two Page Outline - Due Monday, November 9***

Provide an approximately 2-page 1 ½ spaced outline or plan that articulates the major components of your final research project. Include a tentative title, initial abstract, and a note about which type of paper you are writing (design a learning environment, evaluate a learning environment, lit review, or other). Be sure to include the foundational research that serves as background for your ideas, including literature from ED9737. Also address the following questions.

- What ideas will you present in the introduction to frame your study?
- What ideas and/or papers will you explore within the paper body?
- What summary, implications, or conclusions will wrap up your review or design?
- What remaining resources, questions, or concerns do you have at this point?

Expanded Outline - Due Monday, November 23

This revised document should incorporate the comments from the instructor. This document should be more fully developed than the November 9 document. It should show both organizational and conceptual development. Include a tentative title, initial abstract, and a note about which type of paper you are writing (design a learning environment, evaluate a learning environment, lit review, or other). It should also include the current reference list for your project.

Final Class Poster Session – Monday, December 7

You will create a poster or some other visual piece that you can share with the class during the final class session, based on your final paper. We will have a class poster fair to review everyone's work and provide each other with feedback. I will provide more specific guidelines for the poster when it gets closer.

Final Paper - Due Friday, December 14

Papers will be judged on (a) quality and quantity of ideas presented, overall; (b) quality and quantity of literature discussed; (c) quality of original contributions; and (d) clarity of presentation and organization and coherence of ideas.

All final papers must use APA styles and correct English grammar. Make sure it is clear which type of paper you are writing (design a learning environment, evaluate a learning environment, lit review, or other). You must cite multiple papers read for class, and you must cite some literature not read for class, as well. The papers should be approximately 15 pages in length, using 1-1/2 spacing.

Use this checklist to make sure your paper contains all of the following:

- a. A title
- b. A 200 word or less abstract
- c. An introduction outlining the major ideas and major justification for these ideas
- d. Paper body with appropriate citations in APA format
- e. A conclusion including a discussion of educational implications of this work

- f. A reference list in APA format – full citations for all literature and documents discussed including web pages, journal articles, and curricula
- g. Figures, charts or tables (if applicable)

GRADING PROCEDURES

Your grade for each assignment as well as your final grade will be determined by the following scheme:

A 94-100	A- 90-93	B+ 87-89	B 84-86	B- 80-83	C+ 77-79
C 74-76	C- 70-73	D+ 67-69	D 64-66	D- 60-63	F below 60

POLICIES

- a) Students will be expected to attend all classes and to be punctual. If you know you are going to miss a class, please let me know in advance. If you are unable to attend class, you need to turn in a short written summary of the readings for that class. If you have to miss 3 classes or more, please withdraw from the course.
- b) You are strongly discouraged from taking an incomplete for this course. The Lynch School of Education has a grading policy for graduate students. Incompletes on Fall semester grades will be changed to an “F” on March 1 if the work has not been completed by that time.
- c) **BC Academic Integrity:** the pursuit of knowledge can proceed only when scholars take responsibility and receive credit for their work. Recognition of individual contributions to knowledge and of the intellectual property of others builds trust within the University and encourages the sharing of ideas that is essential to scholarship. Similarly, the educational process requires that individuals present their own ideas and insights for evaluation, critique, and eventual reformation. Presentation of others’ work as one’s own is not only intellectual dishonesty, but also undermines the education process. Plagiarism, that is, failure to properly acknowledge sources written or electronic, used for verbatim quotations or ideas, is a violation of academic integrity. Each student is responsible for learning and using proper methods of paraphrasing and footnoting, quotation, and other forms of citation to ensure that the original author, speaker, or course of the material used is clearly acknowledged. Suspected cases of academic dishonesty will be brought to the attention of the Dean’s office. See <http://www.be.edu/offices/stserv/academic/rescources/policy/#integrity> for additional details about Academic Integrity.
- d) **BC Students with a Disability or Suspected Disability:** If you are a student with a documented disability and will be requesting accommodations, please register with either Kathy Duggan [Kathleen.duggan@bc.edu], Associate Director, Academic Support Services, the Connors Family Learning Center (learning disabilities and ADHD) or Suzy Conway [Suzy.conway.1@bc.edu], Assistant Dean for Students with Disabilities (all other disabilities). *Advance notice and appropriate documentation are required for accommodations.*
- e) Assignments are due on their due date. If you have trouble meeting a due date, please notify me before the due date via e-mail, providing a reason and negotiating a mutually agreeable alternate date. Unauthorized late assignments will forfeit 10% of the total assignment score per day.

WEEKLY SCHEDULE AND READINGS

There is one required book for the class: Sawyer, R. K. (Ed.) (2014). *The Cambridge Handbook of the Learning Sciences, Second Edition*. Cambridge, MA: Cambridge University Press. Below the book is referred to as – *Handbook*.

All other readings can be found on Canvas under the appropriate week. This includes a couple of chapters from a second book: Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy. Please bring the readings to class each week (either hard copy or electronic). You only need to bring the readings for the class in the given week.

Class	Topic	Readings	Assignments
Class 1 August 31	Introduction to the Course and the Learning Sciences	None (first day of class)	
No Class Sept. 7	Labor Day – No Class		
Class 2 Sept. 14	Knowledge and Knowing	Sawyer, R. K. (2014). Chapter 1: Introduction: The New Science of Learning, <i>Handbook</i> . Bransford, J. D. et al. (2000). Chapter 2: How Experts Differ from Novices. <i>How People Learn</i> . Greeno, J. G. (2014). Chapter 7: Learning in activity. <i>Handbook</i> . Putnum, R. T & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? <i>Educational Researcher</i> , 29(1), 4-15.	
Class 3 September 21	Culture and Identity	Nasir, N. S., et al. (2014) Chapter 34: Learning as Cultural Process. <i>Handbook</i> Sfard, A & Prusak, A. (2005). Telling identities: In search of an analytic tool for investigating learning as a culturally shaped activity. <i>Educational Researcher</i> , 34(4), 14-22. Thompson, J. (2014). Engaging girls' sociohistorical identities in science. <i>The Journal of the Learning Sciences</i> , 23(3), 392-446. Lee, C. (2006). 'Every good-bye ain't gone': analyzing the cultural underpinnings of classroom talk. <i>International Journal of Qualitative Studies in Education</i> , 19(3), 305-327.	
Sept. 28	Kate at NSF PI meeting and at the International Society for Design and Development in Education (ISDDE)		

No Class			
Class 4 Oct. 5	Disciplinary Knowledge and Transfer	<p>Stevens, R., Wineburg, S., Herrenkohl, L. R. & Bell, P. (2005). Comparative understanding of school subjects: Past, present, and future. <i>Review of Educational Research</i>. 75(2), 125-157.</p> <p>Wagner, J. F. (2010). A transfer-in-pieces consideration of the perception of structure in the transfer of learning. <i>The Journal of the Learning Sciences</i>, 19(4), 443-479.</p> <p>Engle, R. A. (2006). Framing interactions to foster generative learning: A situative explanation of transfer in a community of learners. <i>The Journal of the Learning Sciences</i>, 15(4), 451-498.</p>	
Oct. 12	Columbus Day – No Class		
No Class			
Class 5 Oct. 19	Designing Learning Environments	<p>Bransford, J. D. et al. (2000). Chapter 6: The Design of Learning Environments. <i>How People Learn</i>.</p> <p>Lu, J., Bridges, S., & Hmelo-Silver, C. E. (2014). Chapter 15: Problem-Based Learning. <i>Handbook</i>.</p> <p>Kapur, M. & Bielaczyc, (2012). Designing for Productive Failure. <i>The Journal of the Learning Sciences</i>, 21(1), 45-83.</p> <p>Ghousseini, H., Beasley, H. & Lord, S. (2015). Investigating the potential of guided practice with an enactment tool for supporting adaptive performance. <i>The Journal of the Learning Sciences</i>, 24(3), 461-497.</p>	
Class 6 Oct. 26	Research Methodologies	<p>Barab, S. (2014). Chapter 8: Design-Based Research: A Methodological Toolkit for the Learning Scientist. <i>Handbook</i>.</p> <p>The design-based research collective (2003). Design-based research: An emerging paradigm for educational inquiry. <i>Educational Researcher</i>, 32(1), 5-8.</p> <p>Enyedy, N. & Stevens, R. (2014). Chapter 10: Analyzing Collaboration. <i>Handbook</i></p> <p>Baker, R. & Siemens, G. (2014). Chapter 13: Educational Data Mining and Learning Analytics. <i>Handbook</i>.</p>	Position Paper Due Monday, Oct. 26
Class 7 Nov. 2	Making Learning Meaningful	<p>Järvelä, S & Renninger, K. A. (2014). Chapter 33: Designing for Learning: Interest, Motivation and Engagement. <i>Handbook</i>.</p> <p>Barron, B. (2006). Interest and self-sustained learning as catalysts of development: A learning ecology perspective. <i>Human Development</i>, 49, 193-224.</p>	

		Gresalfi, M. S. (2009). Taking up opportunities to learn: Constructing dispositions in mathematics classrooms <i>Journal of the Learning Sciences</i> , 18(3), 327-369.	
Class 8 Nov. 9	Designing Scaffolds	Reiser, B.J. & Tabak, I. (2014). Chapter 3: Scaffolding, <i>Handbook</i> . Grossman, P. & Thompson, C. (2008). Learning from curriculum materials: Scaffolds for new teachers. <i>Teaching and Teacher Education</i> , 24(8), 2014-2026. Cromley, J. G. & Azevedo, R. (2005). What do reading tutors do? A naturalistic study of more and less experienced tutors in reading. <i>Discourse Processes</i> , 40(2), 83-113.	Two-page Outline for Final Project Due Monday, Nov. 9
Class 9 Nov. 16	Supporting Discourse	Wells, G. & Arauz, R. M. (2006). Dialogue in the Classroom, <i>The Journal of the Learning Sciences</i> , 15(3), 379-428. Borko, H., Jacobs, J. Eiteljorg, E. & Pittman, M. E. (2008). Video as a tool for fostering productive discussions in mathematics professional development. <i>Teaching and Teacher Education</i> , 24, 417-436. McNeill, K. L. & Pimentel, D. S. (2010). Scientific discourse in three urban classrooms: The role of the teacher in engaging high school students in argumentation. <i>Science Education</i> , 94(2), 203-229.	
Class 10 Nov. 23 Attend Tony Bryk Talk – Murray Room @ 4:30	Policy and The Future of Learning Environments	Penuel, W. R. & Spillane, J. P. (2014). Chapter 32: Learning Science and Policy Design and Implementation: Key Concepts and Tools for Collaborative Engagement. <i>Handbook</i> . Sawyer, R. K. (2014). Chapter 36: Conclusion: The Future of Learning: Grounding Educational Innovation in the Learning Sciences. <i>Handbook</i> . Roschelle, J., Bakia, M., Toyama, Y., & Patton, C. (2011). Eight issues for learning scientists about education and the economy. <i>The Journal of the Learning Sciences</i> , 20(1), 3-49. Bryk, A. S., Gomez, L. M. & Grunow, A. (2011). Getting ideas into action: Building networked improvement communities in education. In M. Hallinan (ed.), <i>Frontiers in sociology of education</i> . (pp. 127-162). Dordrecht, the Netherlands: Verlag	Expanded Outline for Final Project Due Monday, Nov. 23
Class 11 Nov. 30	Developing Community	Miyake, N. & Kirschner, P. A. (2014). Chapter 21: The Social and Interactive Dimensions of Collaborative Learning. <i>Handbook</i> . Herrenkohl, L., Palincsar, A., DeWater, L., Kawasaki, K. (1999). Developing scientific communities in	

		<p>classrooms: A sociocognitive approach. <i>The Journal of the Learning Sciences</i>, 8(3&4), 451-493.</p> <p>Horn, I. S. & Kane, B. D. (2015). Opportunities for professional learning in mathematics teacher workgroup conversations: Relationships to instructional expertise. <i>The Journal of the Learning Sciences</i>, 24(3), 373-418.</p>	
Class 12 Dec. 7	Class Poster Session	No readings	<p>Final poster due Monday, Dec. 7</p> <p>Final paper due Monday, Dec. 14</p>