PSYCH 4500/6500 Psychology at the Sciencenter!

Fall 2022
Uris Hall, Room G88
Thursdays, 1:30-4:30
Course Website: https://canvas.cornell.edu/courses/45313

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Course objectives and learning goals

The course will develop students' ability to effectively communicate scientific knowledge to the public, while also promoting community interest and understanding of how their minds, and the minds of others, work. We expect that this course will lead to intermediate levels of achievement in several learning outcomes: civic engagement (improved public understanding of science), integrative learning (translating academic concepts to hands-on public exhibits), and critical reflection (evaluation through writing, prototyping, and interactions with the public).

Graduate students will be able to draw on these skills in their teaching and writing, and when describing research to colleagues and the public (e.g., on their web pages or during interviews). These skills are increasingly important for acquiring research funding, which often depends on identifying the potential societal impact of a research project. Researchers will also benefit from their interactions with children and adults in their community, gaining perspective on the public's understanding of and interest in psychological science. Undergraduate students who participate in the course may use the skills they learn in academia or other contexts, including science journalism and community outreach. Students will learn about the importance of engagement with the public, from topic selection to exhibit design and assessment of learning outcomes.

Our classes will consist of a combination of presentations, discussion, brainstorming, and hands-on exhibit building. No previous building or design experience is necessary.

Evaluations and grading

This course is a seminar and enrollment will be limited. We will emphasize high-quality discussion of the issues raised by the readings and participation in class activities. Grades will be based on the following activities:

- presenting material in-class and to the public
- writing discussion questions
- "RadioLab" interview

- Sciencenter observation write up
- pre- and post-semester reflection essays
- participation in class discussion, generation of exhibit topics, prototyping exhibits, and incorporation of feedback from faculty, Sciencenter staff, and the public
- development and use of evaluation methods
- Exhibit User Guide for Sciencenter

Readings

Weekly readings are listed in the course schedule. All readings will be freely available online, through the course reserve, or through Canvas. *Please contact us if you have any trouble obtaining an assigned reading.*

Discussion questions

"A discussion question is one that invokes thought, synthesis, criticism, integration, comparison, evaluation, debate, distress, and hollering."
-- Esther Thelen

For many of our readings (we will let you know which ones), you will submit a one-paragraph discussion question motivated by an issue raised in the readings. A good discussion question is open-ended, not one with a yes/no answer. For example, you can question theoretical claims or apply a theory to a new issue, draw comparisons or contrasts between readings, or suggest a study that could be done to test a claim. In addition to your main question, you can add questions on specific points from the readings that seem confusing or ambiguous. *Discussion questions are due by 8pm on the Tuesday before each meeting to give everyone enough time to read and comment on them.* Post your discussion question to the bulletin board on the course Canvas site.

Pre- and Post-Semester Reflection Essays

These essays will be opportunities to reflect on your role in science communication, and how this course contributes to that. We will send a formal prompt for these a week before the due date.

Group Observation at the Sciencenter

Exhibit development begins by considering how people - both children and adults - interact with and use them. What works? What could be improved on? And what should be put aside? For this assignment students will observe how guests at the Sciencenter explore the space, interact with the exhibits, and what they (may) take away from them. More information will be distributed to the class a week before this assignment is due.

“RadioLab” Interview

The purpose of this assignment is to gain experience communicating scientific concepts with a sophisticated adult audience. For this assignment, you and a partner will create a mock interview for a science oriented media program, such as RadioLab. You will trade off being the interviewer and the interviewee. The topic will be on a psychological or brain science concept that you have been working with through the semester.

Exhibit User Guide for Sciencenter

This document, written by your exhibit team at the end of the semester, will serve as an instruction manual for future use by Sciencenter staff.

Academic Integrity: You are expected to adhere to the Cornell University Code of Academic Integrity. This can be found at http://cuinfo.cornell.edu/Academic/AIC.html. By submitting your work for academic credit, you are affirming that it is your own. Collaboration is allowed and encouraged for group presentations.

Students with Disabilities: We are committed to ensuring that all students have the opportunity to do well in this course. Please give us your Student Disability Services (SDS) accommodation letter as soon as possible. This will give us adequate time to arrange your approved academic modifications. Meeting with us in our office hours will help ensure confidentiality. If you need an immediate accommodation, please speak with us after class or send an email message to us and/or SDS at sds_cu@cornell.edu. If the need arises for additional accommodations during the semester, please contact SDS.

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Course Overview and Tentative Schedule

This schedule and reading list could change. Readings are due the date they appear in the syllabus (including the first day of classes). Please check the course website frequently. Readings will be drawn from the primary literature as well as from the following books:

TPM: *The Participatory Museum* (Nina Simon)
CSE: *Communicating Science Effectively* (National Academy of Sciences)
PEG: *Practical Evaluation Guide* (Diamond, Horn, & Uttal)

TPM is available online here: http://www.participatorymuseum.org/read/
All other readings will be available on the course Canvas page or at the links provided.

Week 1 (August 25): Communicating about science through design

Representatives from the Sciencenter - Introduction to the Sciencenter

Goals: Explore the challenges of communicating scientific findings and processes to the public via interactive exhibits.

Activities: Hands on exhibit exercise 1) using design briefs and 2) creating from concepts.

Readings:

- What does research say about how to effectively communicate science? *The Conversation*.
- TPM: Preface and Chapter 1, *Principles of Participation.*

Assignment Due:

- Pre-semester reflection essay

Week 2 (September 1): The Sciencenter!

Meet at Uris Hall, we will carpool to the Sciencenter for orientation with educators, tour of shop (with Adrienne Testa)

Goals: Learn about the exhibits at the Sciencenter, meet the staff, learn about exhibit development and building connections with the community. Do an in-depth tour of a few exhibits and evaluate an exhibit – what would you change? Examine methods for topic selection (idea board).

Activities: Tour the Sciencenter and exhibit evaluation.

Readings:

- CSE: Section 1, *Using Science to Improve Science Communication.*

Assignment Due:

- Discussion question
- Sign up for group observation at SC during 9/2 - 9/7. These will be groups of three (use Google calendar sign up so no groups overlap) - write up due on 9/8
- For next week: see idea generation discussion board on Canvas

Week 3 (September 8): Exhibit development and evaluation

Adrienne Testa Presentation - The Joy of Frustration

Goals: Adrienne Testa presentation on SC process of exhibit development and evaluation. Also discuss how different audiences might present different challenges/goals.

Activities: Balloons and BOX design game. Form exhibit design groups.

Readings:

- TPM: Chapter 2, *Participation Begins with Me*
- Vallee-Touranguae et al (2016). Interactivity mitigates the impact of working memory depletion on mental arithmetic performance. *Cognitive Research: Principles and Implications*, *1*(1), 26. https://doi.org/10.1186/s41235-016-0027-2
- Jaeger, Wiley, & Moher (2016) Leveling the playing field: Grounding learning with embedded simulations in geoscience. *Cognitive Research: Principles and Implications*, *1*(1), 23. https://doi.org/10.1186/s41235-016-0026-3

Assignment Due:

- Discussion question
- SC observation write-up due

Week 4 (September 15): Topic generation and peer-review 1

Goals: Topic presentations and select two or three topics for further investigation (peer review process) and prototyping. Should identify goals for the exhibits. Write ideas on note paper, organize, map, consolidate

Activities: Present and brainstorm exhibit ideas.

Readings:

- TPM: Chapter 3, *From Me to We*
- PEG: Chapter 3, *Measuring Learning.*

Assignment Due:

- Find Your Phenomena: Each group will find and present three topics for an exhibit from psychology journals or textbooks.

Week 5 (September 22): Exhibit design

Goals: Work on your prototypes and consider the challenges of exhibit/public presentation development and generate ideas/methods to overcome them. Start to think about evaluation of success and how to get feedback from public. What does the audience want to know? What do you want to tell them (does it change with different age groups)? How do you get your 1-2 points across?

Activities: Start prototyping!

Readings:

- TPM: Chapter 4, *Social Objects*
- TPM: Chapter 10, *Evaluating Participatory Projects*
- Nina Simon: Art of Relevance TED talk https://www.youtube.com/watch?time_continue=56&v=NTih-l739w4

Assignment Due:

- Discussion question: Which aspects of the readings were most useful for informing your exhibit design and ideas?

Week 6 (September 29 & October 1): Deploy the prototypes (Round 1)!

Meet at Uris Hall, we will carpool to the Sciencenter - 1.5 hours each day

Goals: Have roughly mocked up prototypes ready for children and parents to try out at the Sciencenter. Be prepared for entropy. Collect evaluation data.

Activities: Test the prototypes at the Sciencenter!

Week 7 (October 6): "If I knew then what I know now…"

Goals: Discuss feedback from prototyping, plan next iteration of surviving exhibits, discuss evaluation techniques.

Activities: Work out how to improve exhibit prototypes. Start prototype revisions. "Critique and fix": photos of good and bad exhibits from science centers and museums.

Readings:

- Evans, et al. (2016). The Spiral Model, in *Cognitive Development in Museum Settings*.
- CSE: Section 2, *The Complexities of Communicating Science.*

Assignment Due:

- Discussion question
- Work on prototype revisions

Week 8 (October 13): Communicating as performance

Bruce Levitt, Professor of Theatre, Film, and Dance, Cornell
https://pma.cornell.edu/bruce-levitt

Goals: Learn how to use theater and movement techniques to communicate science to diverse audiences.

Activities: Improv activities.

Assignment Due:

- Work on prototype revisions

Week 9 (October 20): Evaluation

Erin Jant, Western Kentucy University
https://sites.google.com/binghamton.edu/jantcdll/home?authuser=0

Goals: Discuss popular approaches to evaluation in science and technology centers, which data are collected and how they are collected. Generate evaluation strategies and materials for the prototypes. Focus after this should be on minor changes to prototypes and development of evaluation materials.

Activities: Work out concrete evaluation strategies for exhibit prototypes.

Readings:

- Willard, A. K., Busch, J. T. A., Cullum, K. A., Letourneau, S. M., Sobel, D. M., Callanan, M., & Legare, C. H. (2018). Explain This, Explore That: A Study of Parent–Child Interaction in a Children's Museum. *Child Development, 90*(5), 1–20. http://doi.org/10.1111/cdev.13232
- Callanan, M. A., Castañeda, C. L., Luce, M. R., & Martin, J. L. (2017). Family Science Talk in Museums: Predicting Children's Engagement From Variations in Talk and Activity. *Child Development, 88*(5), 1492–1504. http://doi.org/10.1111/cdev.12886
- PEG: Chapter 6, *Observational Tools* and Chapter 7, *Interviews and Questionnaires*
- *Optional: NSF 2010 User-Friendly Handbook for Project Evaluation*

Assignment Due:

- Discussion question
- Work on prototype revisions

Week 10 (October 27 & October 29): Deploy the prototypes (Round 2)!

Meet at Uris Hall, we will carpool to the Sciencenter - 1.5 hours each day

Goals: Have new and revised prototypes ready for children and parents to try out at the Sciencenter. Be prepared for entropy. Collect evaluation data.

Activities: Test the prototypes at the Sciencenter!

Week 11 (November 3): Communicating about communicating

Bruce Lewenstein (Professor of Science Communication) Presentation - Science Communication
https://blogs.cornell.edu/lewenstein/

Readings:

- Bobek, E., & Tversky, B. (2016). Creating visual explanations improves learning. *Cognitive Research: Principles and Implications*, *1*(1), 27. http://doi.org/10.1186/s41235-016-0031-6
- Durant, J. et al., (2016). *Science Live: Surveying the landscape of live public science events*. https://livescienceevents.files.wordpress.com/2016/02/2016-science-live-landscape-survey.pdf
- Shouse, A., Lewenstein, B. V., Feder, M., & Bell, P. (2010). Crafting Museum Experiences in Light of Research on Learning: Implications of the National Research Council's Report on Informal Science Education. *Curator: The Museum Journal*, *53*(2), 137–154. http://doi.org/10.1111/j.2151-6952.2010.00015.x

Assignment Due:

- Discussion Question
- Work on prototype revisions

Week 12 (November 10): A bigger picture

Sarah Ingraham - Luci Creative https://lucicreative.com
Mike out of town

Goals: Discuss the challenges of and strategies for communicating science to audiences with diverse ages, educational backgrounds, and willingness to accept scientific perspectives. Non-profit vs profit differences and similarities?

Activities: Demo and get feedback on prototypes from Sarah Ingraham

Readings:

- CSE: Section 3, *The Nature of Science-Related Public Controversies.*
- Lewandowsky, S, & Oberauer, K. (2016). Motivated rejection of science. *Current Directions in Psychological Science, 25* (4), 217 – 222.
- Shtulman, A. (2016). Why we get the world wrong. *Scienceblind: Why our intuitive theories about the world are so often wrong*.

Assignment Due:

- Discussion question
- Work on prototype revisions

Week 13 (November 17): Talking science to adults

Khena out of town

Goals: Effective science communication involves learning how to convey one's research to adults in a concise and compelling manner. We see this all the time in

Activities: Share and offer feedback on the podcast-style interviews that are due for this class. Consider how Randy Olson's "And, But, Therefore" approach can be used to effectively communicate science through media interviews and in community spaces like the Sciencenter.

Readings:

- Chapters TBA from Randy Olson's Houston We Have a Narrative
- Optional: Randy Olson Interview: https://www.youtube.com/watch?v=ijC2g6FBdXI

Assignment Due:

- RadioLab interviews
- Work on prototype revisions

Week 14 (November 24): Thanksgiving break

Week 15 (December 1 & 3): Show off for the experts!

Meet at Uris Hall, we will carpool to the Sciencenter - 1.5 hours each day

Goals: Prototyping exhibits and evaluation strategies. Give a presentation to Sciencenter staff about our process, what we learned, and what we think could be better. Get feedback from the Sciencenter staff. Discuss what worked, what didn't, and how to make it better (reflecting on exhibit, the course, etc.). Critically evaluate the exhibits and the course.

Activities: Demo your exhibits for staff and visitors at the Sciencenter.

Assignments:

- Final revisions to prototypes.
- Exhibit User Guide for Sciencenter
- Post-semester reflection essay (due dat TBA)