

**New York University**  
**Steinhardt School of Culture, Education and Human Development**  
**Department of Teaching and Learning**

E14.3021 Professional Seminar in Science Education:  
Conceptual Foundations of Science Education (2 points)  
+ E14.2300.002 Independent Study:  
Conceptual Foundations of Science Education (1 point)

Fall 2010  
Tuesdays 5:15-6:35pm  
East Building, Room 640

**Professor:** Susan A. Kirch  
**Office Hours:** Thursdays 5-6pm (or by email appointment)  
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Preferred Pre-requisite: Historical Review of Science Education Research

**Course Description:**

In this course we will study the role of theory in science education research. To this end we will (1) read accounts by researchers describing their research and the theoretical framework they used, (2) read the work of theorists employed by educational researchers, (3) review current literature in science education research and articles of interest to see how theory is presented in these works, and (4) begin to determine how theory can help students shape their research questions in preparation for dissertation proposal seminar.

**Assignments**

*Response/Reaction papers:* Each week students will prepare 500-600 word response/reaction paper to the required readings. These are not summaries, but analytical responses. At the end of each paper also list 3 questions you have related to the readings. These papers should be submitted to the *Reaction Paper Discussion Board* on the course BlackBoard site.

If you are wondering, "What is a reaction/response paper?" then see the Writing Studio description from Duke University attached.

These papers are due weekly at the beginning of class.

*Discussion Leader:* Group discussions about the assigned readings will be led by class discussants. Each week a student will present a synopsis of the selected readings starting with Session Two. Following the synopsis and clarification questions, the discussant will moderate the discussion. Presenters should prepare about 8 discussion questions related to the readings that will focus the group's analysis and inquiry.

*Research question exploration:* Develop 5-8 questions about your area of interest in science/environmental education that you could ask using the theoretical perspective(s) presented in the readings. Due dates are provided in the syllabus.

### **Course Schedule (subject to change)**

#### **Week 1 September 7**

##### **What is the role of theory in educational research?**

Course business (discuss readings, schedule and assignments)

*Writing Prompt:* Based on what you have read, your experiences, and your coursework in the doctoral program, draw a concept map or conceptual model of how you currently view the role of theory in educational research.

#### **Week 2 September 14**

##### **What is the role of theory in educational research?**

###### Assignments:

- Present to the group a 6-minute talk on your dream for science/environmental education.

Review your concept map from 9/7 and revise it based on the readings this week.

###### Readings due:

- Bannan-Ritland, B. (2003). The role of design in research: The integrative learning design framework. *Educational Researcher*, 32: 21-24.
- hooks, b. (1994). Chapter 5. Theory as liberatory practice, in *Teaching to transgress* (pp. 59-75). New York: Routledge.
- Schoenfeld, A.H. (1999). Looking toward the 21<sup>st</sup> century: Challenges of educational theory and practice. *Educational Researcher*, 28: 4-14.
- Suppes, P. (1974). The place of theory in educational research. *Educational Researcher*, 3: 3-10.
- Thomas, G. (1997). What's the use of theory? *Harvard Educational Review*, 67(1): 75-104.
- Tobin, K. (2006). Chapter 2. Qualitative research in classrooms: Pushing the boundaries of theory and methodology. In *Doing educational research: A handbook*. Rotterdam: Sense.
- Wallace, J. (1997). Perceptions and theoretical frameworks. *Journal of Research in Science Teaching*, 34(4): 319-322.
- Anfara, Jr., V.A. and Mertz, N.T. (2006). Introduction. In *Theoretical frameworks in qualitative research*. Thousand Oaks, CA: Sage Publications. H62.T427 (2006)
- Creswell, J.W. (2003). Chapter 7. Use of theory. In *Research design: Qualitative, quantitative, and mixed methods approaches* (2<sup>nd</sup> edition). Thousand Oaks: Sage Publications. H62.C6963 (1994)

#### **Week 3 September 21**

## Theories of Culture and Social Structure

### Assignment:

- Response paper (500-600 words) – see attached description.

### Readings Due:

- Geertz, C. (1977, 2000). *The interpretation of cultures*. New York: Basic Books.  
(Chapters 1-7) GN315 .G36 (BRES Collection)
- Sewell, W. H. Jr. (1999). The concept(s) of culture. In V. E. Bonnell & L. Hunt (Eds.), *Beyond the cultural turn* (pp. 35-61). Berkeley: University of California Press.
- Swidler, A. (1986). Culture in action: Symbols and strategies. *American Sociological Review*, 51, 273-286.
- Giddens, A. (1986). *The Constitution of Society: Outline of the Theory of Structuration*. Berkeley: University of California Press. (Chapters 1-2 pp. 1-92) HM24 .G4465 198
- Shilling, C. (1992). Reconceptualising structure and agency in the sociology of education: Structuration theory and schooling. *British Journal of Sociology of Education*, 13(1), 69-87.

## Week 4 September 28

### Assignment:

- List 5-8 questions about your area of interests in science/environmental education that you could ask using the theoretical perspective(s) presented in the readings last week.

### Application readings due:

- Henstrand, J.L. (2006). Chapter 1. Seeking an understanding of school culture: Using theory as a framework for observation and analysis. In V.A. Anfara, Jr. and N.T. Mertz (Eds.), *Theoretical frameworks in qualitative research* (pp. 1-22). Thousand Oaks, CA: Sage Publications. H62.T427 (2006)
- Watkins, S.C. and Swindler, A. (2009). Hearsay Ethnography: Conversational Journals as a Method For Studying Culture in Action, *Poetics* 37(2):162-184.
- Olitsky, S. (2005). Social and cultural capital in science teaching: Relating practice and reflection. In K. Tobin, R. Elmesky and G. Seiler (Eds) *Improving urban science education: New roles for teachers, students and researchers*. Rowan and Littlefield. Q181 .I624 2005

## Week 5 October 5

### Field Theory

### Assignment:

- Response paper (500-600 words) – see attached description.

### Readings Due:

- Bourdieu, P. and Passeron, J. (1977). *Reproduction in education, society and culture*. London: Sage. (Book I: Foundations of a theory of symbolic violence, pp. 1-68)  
[bobst out]

- Bourdieu, P. (1986) The forms of capital. In J. Richardson (Ed.) *Handbook of Theory and Research for the Sociology of Education* (New York, Greenwood), 241-258.  
<http://www.marxists.org/reference/subject/philosophy/works/fr/bourdieu-forms-capital.htm>
- Lewin, K. (1943). Selected readings from *Resolving Social Conflicts & Field Theory in Social Science*, Washington, D.C.: American Psychological Association, 1997 (electronic version available through BOBST @  
<http://ezproxy.library.nyu.edu:16705/index.cfm?fa=browsePB.chapters&pbid=10269>. (Section 1, 2, 13, 14, 20-23)

*Optional:*

Grenfell, M. (ed) (2008) "Pierre Bourdieu: Key concepts" London, Acumen Press. (or some equivalent)

**Week 6 October 12**

Assignment:

- List 5-8 questions about your area of interests in science/environmental education that you could ask using the theoretical perspective(s) presented in the readings last week.

Application readings due:

- Mutch, C.A. (2006). Adapting Bourdieu's field theory to explain decision-making processes in educational policy. In V.A. Anfara, Jr. and N.T. Mertz (Eds.), *Theoretical frameworks in qualitative research* (pp. 1-22). Thousand Oaks, CA: Sage Publications. H62.T427 (2006)
- Roth, W.-M., Tobin, K. and Ritchie, S. (2008). Time and temporality as mediators of science learning. *Science Education*, 92, 115-140.
- Lewthwaite, B. E. (2008). Towards treating chemistry teacher candidates as human. *Research in Science Education*, 38, 343-363.

**Week 7 October 19**

**Interpersonal Interaction Theory**

Assignment

- Response paper (500-600 words) – see attached description.

Readings

- Collins, R. (2004). *Interaction ritual chains*. Princeton, NJ: Princeton University. HM1111.C64 (Chapters 1-5)
- Turner, J. (2002). *Face to face: Toward a theory of interpersonal behavior*. Stanford, CA: Stanford University. HM1106.T87 (2002) (entire book)

**Week 8 October 26**

Assignment

- List 5-8 questions about your area of interests in science/environmental education that you could ask using the theoretical perspective(s) presented in the readings last week.

### Application readings

- Collins, R. (2004). *Interaction ritual chains*. Princeton, NJ: Princeton University. HM1111.C64 (Chapters 7)
- Collins, R. (2004). Rituals of solidarity and security in the wake of terrorist attack. *Sociological Theory*, 22(1), 53-87.
- Olitsky, S. (2007). Promoting student engagement in science: Interaction rituals and the pursuit of a community of practice. *Journal of Research in Science Teaching*, 44(1), 33-56.
- Milne, C. and Otieno, T. (2006). Understanding engagement: Science demonstrations and emotional energy. *Science Education*, 91(4), 523-553.
- Schroeder, R., Heldal, I. and Tromp, J. (2006). The usability of collaborative virtual environments and methods for the analysis of interaction. *Presence*, 15(6), 655-667.

### **Week 9 November 2**

#### **Theories of Development and Learning (and Consciousness)**

##### Assignment

- Response paper (500-600 words) – see attached description.

##### Readings

- Bransford, J., Brown, A. & Cocking, R. (1999). *How Students Learn History, Math and Science in the classroom*. Washington DC: National Academy Press. (ONLINE NAP) (Read: Introduction; Part III; and “A final synthesis”)
- Noe, A. (2009). *Out of our heads: Why you are not your brain, and other lessons from the biology of consciousness*. New York: Hill and Wang. QP411.N599 (2009) (whole book)
- Roth, W.-M. and Lee, Y.-J. (2007). “Vygotsky’s neglected legacy”: Cultural-historical activity theory. *Review of Educational Research*, 77(2), 186-232.
- Stetsenko, A. (2008). From relational ontology to transformative activist stance on development and learning: Expanding Vygotsky’s (CHAT) project. *Cultural Studies of Science Education*, 3 (2), 471-491.
- Engestrom, Y. (1999). Introduction: Activity theory and individual and social transformation. In Y. Engestrom, Miettinen, R. and R.-L. Punamaki (Eds) *Perspectives on activity theory*. Cambridge University Press. BF619.5.P47
- Engeström, Y. (1991). *Non scolae sed vitae discimus*: Toward overcoming the encapsulation of school learning. *Learning and Instruction*, 1, 243-259.

### **Week 10 November 9**

##### Assignment

- List 5-8 questions about your area of interests in science/environmental education that you could ask using the theoretical perspective(s) presented in the readings last week.

### Application:

- Carter, L. (2008). Sociocultural influences on science education: Innovation for contemporary times. *Science Education*, 92, 165-181.
- Lompscher, J. (1999). Activity formation as an alternative strategy for instruction. In Engestrom, Y., Miettinen, R. and Punamaki, R.-L. (Eds.). *Perspectives on activity theory*. New York: Cambridge University Press. BF619.5.P47
- Hedegaard, M. (1999). Chapter 17. Activity theory in history teaching. In Engestrom, Y., Miettinen, R. and Punamaki, R.-L. (Eds.). *Perspectives on activity theory*. New York: Cambridge University Press. BF619.5.P47

### **Week 11 November 16**

#### **Critical Social Theories**

##### Assignment

- Response paper (500-600 words) – see attached description.

##### Readings

- Villaverde, L.E. (2008). *Feminist theories and education*. New York: Peter Lang. [not owned by Bobst]
- Appiah, K.A. (1992). *In my father's house: Africa in the philosophy of culture*. New York: Oxford University Press. DT352.4.A66 (1992)
- Eagleton, T. (1999). *Marx*. New York: Routledge. [Bobst Tamiment collection B3305.M74 E24 1999 Non-circulating]
- Kincheloe, J.L. (2008). Chapter 2 The foundation of critical pedagogy. In Kincheloe, J.L., *Critical Pedagogy*. New York: Peter Lang. LC196.K55
- Friere, P. (1993). *Pedagogy of the Oppressed*. New York: Continuum. LB880 .F7313 1981

### **Week 12 November 23**

#### **Critical Social Theories cont'd**

##### Assignment

- List 5-8 questions about your area of interests in science/environmental education that you could ask using the theoretical perspective(s) presented in the readings last week.

##### Readings:

- Crenshaw, K. (Ed.) (1995). *Critical race theory: the key writings that formed the movement*. New Press. KF4755.A75 C7 (1995) Bobst RESERVE (Part I overview by Bell pp 1-19; Part II overview by Peller, pp 127-158; Part 5 overview by Callmore pp. 314-328; Part 5 essay by Banks, pp. 329-336; Part 5 essay by Lawrence, pp. 336-339; Part 7 overview by Lee, pp. 441-448)
- hooks, b. (1994). *Teaching to transgress: Education as the practice of freedom*. New York: Routledge. Bobst RESERVE LC196 .H66 1994

##### Application:

Ladson-Billings, G.J. (1999). Preparing teachers for diverse student populations: A critical race theory perspective. *Review of Research in Education*, 24, 211-247.

### **Week 13 November 30**

#### **Bricolage (theory about theorizing)**

##### Assignment

1. Response paper (500-600 words) – see attached description.
2. List 5-8 questions about your area of interests in science/environmental education that you could ask using the theoretical perspective(s) presented in the readings last week.

##### Readings

Kincheloe, J.L. and Berry, K.S. (2004). *Rigour and complexity in educational research: Conceptualizing the bricolage*. London: Open University Press. LB1028.K563 (whole book)

##### Applications

Berry, K.S. (2006). Chapter 4 Research as bricolage: Embracing relationality, multiplicity, and complexity. In Tobin, K. and Kincheloe, J. (Eds.) (2006). *Doing educational research: A handbook*. Rotterdam: Sense Publisher

Steinberg, S.R. (2006). Chapter 5 Critical cultural studies research: Bricolage in action. In Tobin, K. and Kincheloe, J. (Eds.) (2006). *Doing educational research: A handbook*. Rotterdam: Sense Publishers

### **Week 14 December 7**

#### **Identity Development/Formation**

Assignment: Response paper (500-600 words) – see attached description.

##### Readings

Hall, S. and duGay, P. (Eds.) (1996). *Questions of cultural identity*. Thousand Oaks: Sage Publications. HM101.Q47 (Chapters 1, 4, 6, 9, 10)

Gee, J.P. (2001). Identity as an analytic lens for research in education. *Review of Research in Education*, 25, 99-125.

Sfard, A. & Prusak, A. (2005). Telling identities: In search of an analytical tool for investigating learning as a culturally shaped activity. *Educational Researcher*, 34(4), 14-22.

Lave & Wenger (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge. BF318.L36 (whole book)

### **Week 15 December 14**

Assignment:

- List 5-8 questions about your area of interests in science/environmental education that you could ask using the theoretical perspective(s) presented in the readings last week.

Application:

Leuhmann, A.L (2007). Identity development as a lens to science teacher preparation. *Science Education, 91*, 822-839.

Tan, E. & Barton, A.C. (2007). From peripheral to central, the story of Melanie's metamorphosis in an urban middle school science class. *Science Education, 92*, 567-590.

**End course:**

- *Podcast on at least one topic to be posted to T&L Science Ed Page*
- *Go forth and write your dissertation proposal from a theoretical perspective of your choosing!*