CEP 957

CEP 957 Learning in Complex Domains

Syllabus
CEP 957: Learning in Complex Domains
Spring 2011

Class meets on Wednesdays, 4:10-7:00. 132 Erickson Hall
Rand Spiro (510 Erickson Hall; 432-6789; rspiro @msu.edu)

The course will focus on the special problems of learning in complex and ill-structured domains, including those of knowledge application in the "messy" real world.

How do people learn important but difficult subject matter? How can we best prepare students (and teachers) to deal with complex material and, especially, to independently apply their knowledge to diverse new situations?

Given the evidence of our relative lack of success in teaching difficult material and preparing people for independent knowledge application, what directions might a more adequate approach to learning in complex domains take? What are the possible roles of new technologies in enabling new kinds of learning that were difficult to achieve with traditional instructional approaches?

Student requirements

The format of the class will be a mixture of lectures and wide-ranging discussions.

Students will be required to write a 10-15 page term paper that applies ideas from the course to a complex domain with which they are familiar (this may be the research area you are developing or an area in which you teach).

Additionally, students will be expected to do regular reading assignments and participate in class discussions. Occasionally a brief (200-300 words) response to a discussion question will be required. These will be posted at our course's Angel site; you will be asked to respond to some of your fellow students' postings as well.

The class may not meet a time or two during the semester because of the instructor's professional travel commitments. Those classes will be held as online discussions. We will meet during final exam week at the class's scheduled time.

Readings

Two texts will be required (both are available in paperback, and the Klein book is on Kindle too):

George Landow, *Hypertext 3.0*. Johns Hopkins, 2006.

Gary Klein, *Streetlights and shadows: Searching for the keys to adaptive decision* making. MIT Press, 2009.

Journal articles and book chapters will also be assigned. A list of readings will be provided in the second week of the course, after the class has had a chance in the first week to discuss possible directions we might take.

The reading list will evolve during the semester according to student interest and the natural, organically dialectic nature of teaching and learning. Because there is still a paucity of formal disciplinary knowledge about advanced learning in ill-structured domains in the mainstream literature of educational psychology, the more traditional elements of the reading list will be augmented by a very eclectic selection of additional readings

drawn from philosophy, literary theory, anthropology, history, science and other areas that have concerned themselves with problems of complexity.

However, whatever the final choices, the following topics and associated authors are almost surely going to be covered:

Learning in Complex Domains: Provisional Schedule of Topics

[Note: Order and selection of topics may change.]

Week 1: Overview of course & introduction to learning and knowledge application in complex domains.

Week 2: The nature of complex and ill-structured domains. Difficulties in learning due to complexity. The *reductive worldview* and alternative mindsets for complex learning. [Kirschner, Sweller & Clark. Feltovich & Spiro.]

Week 3: Clues from philosophy, anthropology, and literary theory [Wittgenstein; Geertz, Barthes]. Complexity and underlying epistemic beliefs. The central role of *mindset*. [Pepper. White.]

Weeks 4-6: Possible answers to the problem of complexity in new uses of digital, random access text: The Web, complex ill-structuredness, hypertext, and the power of digital disorder for learning and knowledge use. [Landow book, selected chapters.] Reading to learn on the Web – a new kind of complexity. [Coiro & Dobler. DeSchryver & Spiro.]

Weeks 7-8: Challenges of professional cognition and context-sensitive knowledge application (with emphasis on teaching as a knowledge domain) and learning for complexity from cases (with experience acceleration). [Lampert; Shulman; Grossman; Sykes & Bird. Dewey and the concept of the "situation."]

Weeks 9-10: Applying knowledge in real-world domains. [Klein book, selected chapters.]

Weeks 11: Transfer and adaptive expertise. [Bransford & Schwartz.]

Weeks 12-13: Visualization, integral visusal displays, and complexity [Tufte. M. Stephens.] Organistic and ecological approaches to complexity: Clues from biology and the sciences of complexity. [Page. Mitchell. Whitehead. Waldrop. Dewey.] Aesthetic, experiential, intuitive, and tacit knowledge aspects of cognition in complex domains (Polanyi, Lakoff & Johnson, Poincaré, Klein).

Weeks 14-15: Learning in "Grand Social Challenge" areas. The complex demands of the new world of work.