# ARTG 6110 INFORMATION DESIGN THEORY AND CRITICAL THINKING (4SH)

Spring 2014, Thursday / Friday

Northeastern University, Ryder Hall, Room 305

First meeting: Thursday, January 9, 1:00 pm (EST)

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## DESCRIPTION

This seminar course examines theoretical foundations and models of design as it relates to information visualization and delivery. Students will evaluate concepts and models through diagramming exercises, discussions, and writing. The course is structured in three, two-day workshops—with significant preparation before the workshops and intensive work during the workshops (including overnight homework).

## OBJECTIVES

In this course, students will learn

- what conceptual models are and their theoretical basis (in semiotics and linguistics)
- ways to represent models and understand the shape of information
- the role of models in the design process and collaboration
- greater facility in making, reasoning with, and arguing through models

## PROCESS

Students will read a set of articles; then they will create a set of simple diagrams representing each of the main concepts described in each article; and finally they will synthesize what they have learned to create new models of their own (presented as large, composite diagrams).

The outcome of the course will be two sets of pieces:

First, a collection of diagrams of concepts from the readings (e.g., Saussure's model of a sign, Peirce's model of a sign, etc). These diagrams should be collected together at the end of the course in a sort of process book or reference book.

Second, a series of models of design as understood by the student. 1.) A first concept map, providing a baseline—the point from which we are starting. 2.) An intermediate map after the first set of readings. 3.) A final candidate map after the final set of readings. And 4) A final map including refinements based on feedback in the last workshop—the equivalent of a final "paper”.

## REQUIREMENTS

Students should be enrolled in the Interaction Design MFA program or have permission of the instructor. Grad students from other disciplines and mature undergrads are encouraged to participate.

## RULES AND CONDITIONS

**Attendance:** You are allowed one unexcused absence without penalty, however, missed classes will mean that you will miss valuable information. Frequent tardiness and unexcused absences will lead to C, D, and F grades.
**Reading assignments and class activities:** There will be regular reading assignments over the course of the semester, made available through the blackboard site. Since this is a seminar course, it is essential to complete the reading assignments before class. A large part of this seminar is devoted to discussions and in-class analytical exercises. You are expected to actively participate in all activities and complete all necessary readings before class.
**Assignments:** most classes include small assignments, either practical exercises, reaction papers to readings or essays. Each these assignments should not exceed the length of one single-spaced page. Assignments are due 10pm the night before the class. Late delivery of assignments will affect your grade in the following way: for each day that you are late, the grade for the assignment shrinks by one letter.
**Integrity**: you are requested to abide by Northeastern University's Academic Integrity Policy, which you can read at: http://www.northeastern.edu/osccr/academicintegrity/
**The use of email**: for effective email communication, please review http://hbswk.hbs.edu/archive/4438.html

## GRADING

Each class-assignment in both parts of the course will be graded on a scale from A-F. The overall course grade will be calculated as follows:
- The first assignment will count 10%, the second, third, and final assignments 20% each, class participation 20%.
Each assignment will be graded based on the following criteria:

**1) Fit**
Is the representation congruent with the model?
Do representation and model have similar structures?
Are all the elements in the model explicit in the representation?

**2) Least Means**
Could the model be represented in a simpler way?
What can be removed without changing the meaning? (Remove decoration.)
Could conventional symbols or other standard patterns make reading easier?

**3) Consistency**

Are the means of representation consistent?

Similar forms should represent similar functions or similar content. Likewise, similar functions or similar content should be represented by similar forms.

Are all elements and their connections labeled?

**4) Contrast**

What about the model should appear to be most important?

Does the most important thing appear most important? (Not everything is equally important. Important elements of the model should stand out in the representation. One way to achieve contrast is through scale, making more important items larger than less important items.)

**5) Hierarchy**

How do the elements of the system appear to fit together?

Is the structure of the system clearly visible?

Do we know where to look first?

Can we find a clear path through the model?

The final test of the model (and representation) is with the audience. Does the audience understand it?

Do they agree with it?

Do they agree that they agree?

Will they act on it?

Attendance for each and all of the workshop days is mandatory. Class participation will be assessed in the following way: valuable contributions to discussion and class activities will be positively noted (+, ++), missed readings and lack of participation negatively (-, --). The sum of these notes will be weighted and can typically shift the overall grade by one letter. No incomplete will be given except in extenuating and unforeseen circumstances, and you must have already completed a substantial portion of the course, with passing grades.

Grade percentage scales are derived from the GPA calculation in the Academic Catalogue:

A = Outstanding achievement, A– = Less so

B = Good achievement, B+ = More so, B– = Less so

C = Satisfactory achievement, C+ = More so, C– = Less so

D = Poor achievement, D+ = Not so, D– = Less

F = Failure

## WEEKLY SCHEDULE

| Week | Date from | Date to | Activity |
|---|---|---|---|
| 1 | 9-Jan | | Introduction, video conference |
| 2 | 16-Jan | 17-Jan | Dubberly 1st two-day workshop |
| 3 | 23-Jan | | Offenhuber meet with students |
| 4 | 30-Jan | | Meirelles meet with students |
| 5 | 6-Feb | | Review via video conference |
| 6 | 13-Feb | | McDonald meet with students |
| 7 | 20-Feb | | Starr meet with students |
| 8 | 27-Feb | 28-Feb | Dubberly 2nd two-day workshop |
| 9 | 6-Mar | | spring break, no classes |
| 10 | 13-Mar | | Offenhuber meet with students |
| 11 | 20-Mar | | Mid-term review - video conference |
| 12 | 27-Mar | | Offenhuber meet with students |
| 13 | 3-Apr | 4-Apr | Dubberly 3rd two-day workshop |
| 14 | 10-Apr | | Final review - video conference |

## TOPICS OF THE THREE WORKSHOPS

### WORKSHOP 1

Understanding Through Mapping: Concept Maps, Process Maps, Possibility Spaces, and Context Maps

### WORKSHOP 2

Theories of Models: How We Think About What We Design

### WORKSHOP 3

The Social-Political Nature of Designing: The Role of Models in Framing, Arguing, and Collaborating

## READINGS

**For Workshop 1**

16 Jan. *Learning How To Learn,* Novak, j., and Gowin, B., Cambridge University Press, 1984.
The key section for this course is Chapter 2, pages 15 – 54.

"Creating Concept Maps," Dubberly, H., 2010.
http://www.dubberly.com/wp-content/uploads/2010/03/ddo_creating_concept_maps.pdf

In class "interview with Bill Verplank," video in Designing Interactions, Moogridge, B., MIT Press, 2007.

**For Workshop 2**

23 Jan. "Models of Models," Dubberly, H., *Interactions,* ACM, May, 2009.
*http://www.dubberly.com/wp-content/uploads/2009/03/ddo_article_modelsofmodels.pdf*

*Course in General Linguistics*, de Saussure, F., McGraw-Hill, 1959, pages 1-32 and 65-127.

*Philosophical Writings of Peirce*, edited by Buchler, J., Dover, 1955.
pages 98-119 (Chapter 7) and 274-289 (Chapter 18).

6 Feb. "The Mathematical Theory of Communication," Shannon, C. and Weaver, W., University of Illinois, 1964, pages 1-35.

"Institutional Ecology and 'Translation" of Boundary Objects: Amateurs and Professionals In Berkeley's Museum of Vertebrate Zoology, 1907-39," Star, S. and Griesemer, J., *Social Studies of Science*, 1989, page 387-414.

13 Feb. *Conceptual Models: Core to Good Design*, Johnson, J., and Henderson, A., Morgan & Claypool, 2012.
(Please read the whole book; it's only 90 pages.)

20 Feb. *Notes on the Synthesis of Form*, Alexander, C., Harvard, 1964, pages 1-83 (Chapters 1-6).

27 Feb. Workshop 2

**For Workshop 3**

6 Mar. *The Sciences of the Artificial,* Simon, H., MIT Press, 2001, pages 111-138, (Chapter 5, "The Science of Design").

13 Mar. "Why Horst W. J. Rittel Matters," Rith, C. and Dubberly, H., *Design Issues*, Vol. 22, No. 4, Autumn, 2006.

"On the Planning Crisis: Systems Analysis of the 'First and Second Generations'." Rittel, H., *Bedrifts Økonomen*. 8 (1972): 390–396.

20 Mar. "The Design Process," Schön, D., in *Varieties of Thinking*, edited by Howard, V. A., Routledge, 1990, pages 110-140 (Chapter 7).

*The Reflective Practitioner*, Schön, D., pages 76-104, (Chapter 3, "Design as a Reflective Conversation with the Situation").

27 Mar. "What Can Steve Jobs and Jonathan Ive Teach Us About Designing?" Dubberly, H. *Interactions*, May-June, 2012.

4 Apr. Workshop 3

**First Meeting**

9 January, Thursday, 1:00 - 2:00 pm (EST)

Telephone conference call (for sound) + Google Hangouts (for picture)

**Agenda**

Introductions

Review syllabus

Discuss concept maps—vs. mind maps & the importance of links and labels

Discuss assignment

**Assignment**

Read the articles on concept mapping.

- *Learning How To Learn,* pages 15 – 54.
- "Creating Concept Maps,"

Using what you learned from the readings, create a concept map of "design."

Be sure to include a title and signature block.

Format: 11" x 17", landscape orientation, printed, black + white,

Use the typeface Helvetica 10/12 as the main font.

Consider this a sketch, not a typography exercise.

Keep it neat, but don't obsess over the form.

Plan to spend 1-2 hours on the readings and 4-6 hours on the map.

Create a PDF version of your map.

Post your PDF to the course web site.

Adobe Illustrator is a good tool, but other tools may be used.

Due: Wednesday, January 15, 11:59 pm.

Also bring a printed copy to class on the 16th.

The purpose of this assignment is two-fold:

1. To introduce you to concept mapping and begin our discussion of models.
2. To provide a baseline "snapshot" of your model of design.

**Workshop 1**

Thursday, January 16

9:00 Discuss readings.

9:30 Pin up “design” concept maps; each student presents map via projector.

Discuss.

10:15 Break

10:30 Short exercise: Create a concept map of “toast”; present.

Short exercise: Create a diagram explaining how to make toast—a process map; present.

Discuss the difference between concept maps and process maps.

- Description vs prescription; what vs how; noun vs verb

- Map vs path; show Bill Verplank video

12:00 Break for lunch

1:00 Short exercise: Create a map of the design process; present.

Discuss the design process

- Number of steps, shape, begin/end conditions, similarity to other processes

- References

3:00 Break

3:15 Short exercise: Create a diagram of the “space” of bread; present.

Discuss the possible “dimensions” or variables that define a type of bread.

Stretch.

Short exercise: Create a diagram showing bread-making within a larger set of activities—a context map.

Discuss how bread-making relates to other activities.

Assign homework; discuss.

Reflect on the day.

5:00 Adjourn

Homework overnight:

- Create a diagram of the “space” of design—possibilities for focus within practice.

- Create a diagram showing design within a larger set of activities—a context map.

Friday, January 17

9:00 Pin up diagram of the space of design; each student presents diagram via projector.
Discuss.
Pin up diagram of design within a larger domain; each student presents diagram via projector.
Discuss.

10:30 Break

10:45 Lecture on the space of design and design taxonomies with examples.
Recap model types: concept map, process map, space, context map.
Discuss.

12:00 Break for lunch

1:00 Short exercise: Create a "meta-diagram" showing how your "how-to-make-toast" diagram fits into the world; include at least yourself, a user, the toast + toaster, and your original diagram.
Present and discuss.

3:00 Break

3:15 Lecture on a model of models.
Discuss models, evidence, isomorphism
Assign homework; discuss.
Reflection on both days of the workshop.

5:00 Adjourn

**Readings**

- "Models of Models" (reprises class lecture)
- *Course in General Linguistics*, pages 1-32 and 65-127
- Philosophical Writings of Peirce, pages 98-119 (Chapter 7) and 274-289 (Chapter 18)
- "A Mathematical Model of Communication," pages xx-yy
- "…Boundary Objects…"
- *Conceptual Models: Core to Good Design*
- *Notes on the Synthesis of Form*

**Assignment**

- For each set of readings, create simple diagrams illustrating the key concepts.
- Create your own model of design synthesizing the models you've learned so far; represent your model in a diagram, using a visually simple style.
- Prepare a presentation explaining your model.

**Workshop 2**

Thursday, February 27

9:00 Pin up diagram of Saussure models; each student presents diagram via projector.

Discuss.

10:30 Break

10:45 Pin up diagram of Peirce models; each student presents diagram via projector.

Discuss.

12:00 Break for lunch

1:00 Review Shannon model and discuss.

Pin up diagrams of Star model; each student presents diagram via projector.

Discuss.

Pin up diagram of Johnson-Henderson model: each student presents diagrams via projector.

Discuss.

3:00 Break

Pin up models of design; each student presents diagram via projector.

Discuss and critique.

Assign homework; discuss.

Reflection on the day.

5:00 Adjourn

Homework overnight:

- Create a user's conceptual model of a clock.
- Research operation of an early, very simple pendulum-based clock.
- Create a diagram of a functional model of the clock.

Friday, February 28

9:00 Pin up diagram of the conceptual models of a clock; each student presents diagram via projector.
Discuss.
Pin up diagram of the functional models of a clock; each student presents diagram via projector.
Discuss.

10:30 Break

10:45 Lecture and discussion on "subject" vs observations vs models vs representations

12:00 Break for lunch

1:00 Lecture on information structures—basic primitives
Short exercise: Revise conceptual model of a clock.
Present and discuss.

3:00 Break
Short exercise: Revise functional model of a clock.
Present and discuss.
Assign homework; discuss.
Reflection on both days of workshop 2.

5:00 Adjourn

**Readings**

- "The Science of Design"
- "Why Horst W. J. Rittel Matters"
- "On the Planning Crisis: Systems Analysis of the 'First and Second Generations'."
- "The Design Process"
- "Design as a Reflective Conversation with the Situation"
- "What Can Steve Jobs and Jonathan Ive Teach Us About Designing?"

**Assignment**

- For each set of readings, create simple diagrams illustrating the key concepts.
- Create your own model of design synthesizing the models you've learned so far;
  represent your model in a diagram, using a visually simple style.
- Prepare a presentation explaining your model.

**Workshop 3**

Thursday, April 3

9:00 Pin up diagrams of Simon models; each student presents diagram via projector.

Discuss.

Pin up diagram of Rittel models; each student presents diagram via projector.

Discuss.

10:30 Break

10:45 Pin up diagram of Schön design process; each student presents diagram via projector.

Discuss.

Pin up diagram of reflective conversation models; each student presents diagram via projector.

Discuss.

12:00 Break for lunch

1:00 Pin up models of design; each student presents diagram via projector.

Discuss and critique.

Desk crits and in-class work refining model.

Present and discuss.

3:00 Break

Desk crits and in-class work continues.

Present and discuss.

Assign homework; discuss.

Reflection on the day.

5:00 Adjourn

Homework overnight:

- Refine model.

Friday, April 4

9:00 Pin up diagrams; each student presents diagram via projector.

Discuss.

10:15 Break

10:30 Lecture and discussion on the types of information design and related models

12:00 Break for lunch

1:00 In-class exercise: Data explorer

Create a diagram of the conceptual model of a county's election results.

Present and discuss.

Create a wireframe of an interface based on your model.

Present and discuss.

3:00 Break

In-class exercise: Relationship explorer

Create a diagram of the conceptual model of the relationship between eating, exercise, & weight.

Present and discuss.

Create a wireframe of an interface based on your model.

Present and discuss.

Assign homework; discuss.

Reflection on the course as a whole.

5:00 Adjourn

**Assignment**:

- Revise models.
- Compile models from readings into a reference book.
- Create a final composite diagram representing your model of design.

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