Engineering Systems
Doctoral Seminar
ESD.83-- Fall 2011

Class 3
Faculty: Chris Magee and Joe Sussman
TA: Rebecca Saari
Guest: Professor Olivier de Weck (A&A Department and Engineering Systems Division)
Class 3-- Overview

- Welcome, Overview and Introductions (5-10 min.)
- Discussion of ESD.83 faculty-provided theme-related papers led by Jameson Toole (approximately 40 min)
- Break (10 minutes)
- Dialogue with Professor de Weck (55 min)--Redaction provided by Josephine Wolff
- Theme and topic integration: Report from the front; Words and Quotes: Boundaries, Representations, Models, Frameworks and Processes (Sussman)
- Next Steps-preparation for Class 4--(Sussman)
Theme and topic integration: Class 3

- Report from the front--Manslaughter trial of L’Aquila earthquake scientists
- Words
- Quotes
- “Teaching and Learning Time”
- Class 4 Plan (Sussman)
Words/ Phrases

- Bounded Rationality
- Exponential (as in exponential growth)
Quotes

“Art is a lie that tells the truth.”

Pablo Picasso

“Lady Bird Johnson found that in dealing with highway beautification it was like ‘picking up a tangled skein of wool; all the threads are interwoven - recreation and pollution and mental health. and the crime rate, and rapid transit and the war on poverty, and parks....everything leads to something else’.”

“Teaching and Learning Time”

- Boundaries
- Representations, Models, Frameworks and Processes
- Match-up of Class 3 with
  - Framing Questions
  - Learning Objectives
Boundary Concept

Rest of the Environment

 Relevant Environment

 System

 Boundary

 Rules/Heuristics

 For boundary-setting
Different Kinds of Boundaries

- Time
- Geography
- Physical (e.g. a factory)
- Depth
  - Micro/Macro question

- Breadth
  - What other systems relate?
  - How much of the environment do you consider relevant?
Representations, Models, Frameworks and Performance

**Representation**
- What does the system look like?
- How do we capture the knowledge about it?

**Performance**
\[ \text{Performance} = f(\text{system characteristics/environment}) \]
Representations
- Simply the description of a system in both qualitative and quantitative terms

Models
- Quantitative - The language is usually math
- Executable - by this we mean you can get "answers" from it

Frameworks
- Qualitative - Usually natural language
- Executable (but what does this mean in the case of a framework?)
  - Example: Stakeholder analysis
How do you decide when to go from a descriptive representation to
- A executable model
- A executable framework