Reflective Practice and Knowledge Generation

Combining multiple ways of generating knowledge to solve relevant problems
Multiple Ways of Generating Knowledge

- Experimentation
- Speculation
- Imagination
- Story Circle
- Scientific Method
- Statistical Analysis
- Cycle SECI
- Modeling
- Method Delphi
- Reframing
- Conceptual innovation
- Design, etc.
Experimentation

- The main purpose of the activity is to generate positive results (i.e., to make things work.)
- There may be abstraction but it is functional to the effort of design.
- Most of the technological advancement until the 17th century was achieved through experimentation.
Speculation

• When we are trying to think beyond our current knowledge frontier, we are speculating.

• The Theorem is a formal method of speculation developed by the Greeks.

• The core of the theorem is: If A then B; A is a hypothesis and B should be proved.

• Speculation can be very important for generating hypotheses.
Imagination

• Einstein: What would the world look like from the perspective of photon?

• Arthur Clarke: Stationary Satellites

• Julio Verne: Autos fueled by water

• Brainstorming in IDEO: 100 ideas/hour
The purpose of the scientific method is to falsify theoretical hypotheses through experience.

It is possibly the single most important cognitive innovation in History.
Statistical analysis

- It is a method for establishing the relation among variables, or verifying a model, based on the observation of samples of an “universe”.

- The data results come from observation of reality without changing it.

- Statistical Analysis is key when it is not possible to experiment with the object of the research, such as human beings.
The Cycle SECI was developed by Ikujiro Nonaka and Hirotaka Takeuchi as a way of generating knowledge by transforming it, from tacit knowledge to explicit and vice versa.
• Modeling can be used for two main purposes:
  – Theory validation
  – Forecasting

• In “New Kind of Science” and “Mathematica” Stephen Wolfram uses modeling for exploring patterns in nature.

• The importance of modeling will increase in the future.
Reframing

• Reframing is a change in the logic of the description and the analysis of an object.

• The reduction of crime in New York City in the 80s was interpreted by the City’s Mayor and by “Freakonomics” in very different ways.
  – For the Mayor it was a question of police strategy
  – For Freakonomics it was a consequence of the legalization of abortion (Roe versus Wade)

• Reframing generates very different understandings of the same issues.
Conceptual Innovation

- Multiply XXVII by XXIII or 17 by 23
- The invention of the Scientific Method
- The work of Antoine Lavoisier, the creator of Chemistry as a science
- The idea of tacit dimension of knowledge of Michael Polanyi
- The work of Donald Schön creating the concept of “Reflective Practice”
Design

- Designs are artifacts that contain a great amount of knowledge embedded.
- Designs are generated in a dialogue with the situation and with stakeholders.
- Design process is an interaction between an idea (with values imbedded in it), the characteristics of the situation and the expectations of stakeholders.
- The knowledge contained in Designs is more visible for the “experts” in the same discipline.
- The capacity of reframing is decisive for the process of design.