Learning in Complex Environments: Situating Data Science in the Process

Chris Diehl November 7, 2014











Expect the Unexpected

"We're blind to our blindness. We have very little idea of how little we know. We're not designed to know how little we know." Daniel Kahneman

Who killed New Labour? The war in Pakistan's tribal areas America's unending culture wars How to save fish The last typewriter-repair man

What next?

I WANT YOU for STOPPING THE **FINANCIAL CRISIS**

«SYSTEM FAILURE »

Y

The Limits of Prediction

Cascading Uncertainty Limited Observability Cognitive Bias

Complexity on the Rise

Causal Ambiguity Compressed Decision Cycles Increasing Risk Exposure

Economist Intelligence Unit The Complexity Challenge How businesses are bearing up A report from the Economist Intelligence Unit

Beware

Understand the Now

Observe Orient Decide Act

$\mathbf{Z} \mathbf{A} \mathbf{R} \mathbf{A}$

The Old Way: Planning as Prediction

The New Way: Planning as Knowledge Aggregation

Develop Shared Vision

- Slow execution
- Inability to adapt
- Resistance to change
- Disagreement about expected utility

- Overconfidence
- Underestimation of downside risk
- Limited reflection
- Groupthink

Action	Inquiry	
Interpretation	Hypoth Genera	esis tion
Knowledge and Aggr	Discovery regation	
Limited investignment	igation	

- Misleading / ambiguous questions
- Disagreement on problem formulation

- Narrow specification of possible outcomes
- Desire to confirm existing beliefs

- Misalignment with objectives
- Flawed experimental design

"Wicked Problems"

100s of diverse organizations 1,000s of participants Non-English, Non-Western **3rd World** Military Other Citizens 1st World Cultures Languages Military Forces COCOMS **JTF Commanders** NGOs/ **PVOs** Other Global/Regional US Depts/ Int'l Organizations Agencies

Dilemmas in a General Theory of Planning^{*}

HORST W. J. RITTEL

Professor of the Science of Design, University of California, Berkeley

MELVIN M. WEBBER

Professor of City Planning, University of California, Berkeley

ABSTRACT

The search for scientific bases for confronting problems of social policy is bound to fail, because of the nature of these problems. They are "wicked" problems, whereas science has developed to deal with "tame" problems. Policy problems cannot be definitively described. Moreover, in a pluralistic society there is nothing like the undisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct or false; and it makes no sense to talk about "optimal solutions" to social problems unless severe qualifications are imposed first. Even worse, there are no "solutions" in the sense of definitive and objective answers.

George Bernard Shaw diagnosed the case several years ago; in more recent times popular protest may have already become a social movement. Shaw averred that "every profession is a conspiracy against the laity." The contemporary publics are responding as though they have made the same discovery.

Few of the modern professionals seem to be immune from the popular attack whether they be social workers, educators, housers, public health officials, policemen, city planners, highway engineers or physicians. Our restive clients have been telling us that they don't like the educational programs that schoolmen have been offering, the redevelopment projects urban renewal agencies have been proposing, the lawenforcement styles of the police, the administrative behavior of the welfare agencies, the locations of the highways, and so on. In the courts, the streets, and the political

Framing Ambiguity

Problem Complexity

Collective **Reasoning and Action** "Natural Intelligence Reinforcement"

Cognitive Load

Data Science

Thank you!

@ChrisDiehl chris@thedataguild.com

