2016

Socio-environmental relations of non-discrete spaces and architectures

Davidova, Marie

Suggested citation:

Hierarchy in Flux
Scenario:
Retrieve a airplane Blackbox

- Tele-operated robot with toolkit (controlled by umbilicus 6sec delay)
- Robot operators in control room (video, telemetry, sensor arrays)
- “Dry” testing environment
Sociotechnical System

- Leaders
- Robot operators
- Tele-operated robot
- Interface
- Dry-testing
Emergence: higher scale effects

- **Strong Emergence**
  "effects you could not anticipate or deduce"

- **Weak Emergence**
  "predictable collective action"
Engineering Emergence

- Maximize Weak Emergence
- Minimize (eliminate) strong emergence

- Limit interaction between parts of the system
An Analogy

http://arstechnica.com/science/2012/10/going-boldly-what-it-was-like-to-be-an-apollo-flight-controller/
Why does this work?

* Every role is specialized
  * Every specialist is focused on one small set of tasks
  * Every task is clearly defined
  * Inputs and outputs only go up or down one level
* It’s a rigid and well-defined hierarchy that minimizes interaction and organizes the flow of communication and control
  * It is engineered not self-organizing
Wave Theory of HCI

1 – Human Factors
* Emphasizes human-machine coupling
* Treats user as blackbox with inputs and outputs

2 – Cognitivist
* Emphasizes the work/task context
* Supports the user as an intentional agent

3 – Phenomenological
* Emphasizes emergent uses of technology
* Understands the user as a source of meanings
Activity Theory

* Decomposes activity into “Activity, Action, Operation” hierarchy.

* These closely map to Knowledge, Rules, and Skills, respectively.
Reconfiguring the Social Hierarchy

* How do we turn the rigid engineered system into a lightweight adaptable one?

* Parsimony *with* variety
  * Co-locate personnel (from iceberg to ice cube)
  * Redundancy and variability of roles (flexibility of interface)

* Automate skills (build them into the robot)
  * Dry-testing and modeling
What does this have to do with interface design?

- Understanding context is important, but there is a problem with the unit of analysis (level of description)
  - We’ve designed a context but not an interface
  - More like a waterfall than co-evolution

- When we begin to look at the design of the interface itself a new set of dynamics begin to dominate
  - Perception, reasoning, situated-ness, communication
How do we bridge the gap?

Environment

Organization

System

Sociotechnical System

Components

Technologies and UI

Representation & Feedback?

Theories & Methods?

Environment

Sociotechnical System

System

INTERFACE (UI)

Components

DATA and USERS