

Faculty of Design

2016

Socio-environmental relations of non-discrete spaces and architectures

Davidova, Marie

Suggested citation:

Davidova, Marie (2016) Socio-environmental relations of non-discrete spaces and architectures. In: Relating Systems Thinking and Design Symposium (RSD), 13-15 Oct 2016, Toronto, Canada. Available at <http://openresearch.ocadu.ca/id/eprint/1950/>

Open Research is a publicly accessible, curated repository for the preservation and dissemination of scholarly and creative output of the OCAD University community. Material in Open Research is open access and made available via the consent of the author and/or rights holder on a non-exclusive basis.

The OCAD University Library is committed to accessibility as outlined in the [Ontario Human Rights Code](#) and the [Accessibility for Ontarians with Disabilities Act \(AODA\)](#) and is working to improve accessibility of the Open Research Repository collection. If you require an accessible version of a repository item contact us at repository@ocadu.ca.



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



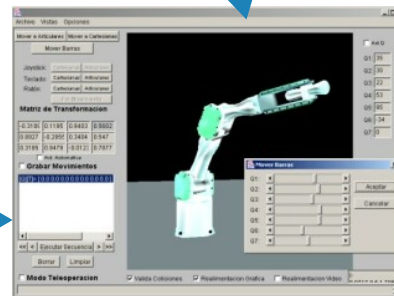
Robot operators



Tele-operated robot



Dry-testing



Interface



Emergence: higher scale effects

- Strong Emergence

“effects you could not anticipate or deduce”

- Weak Emergence

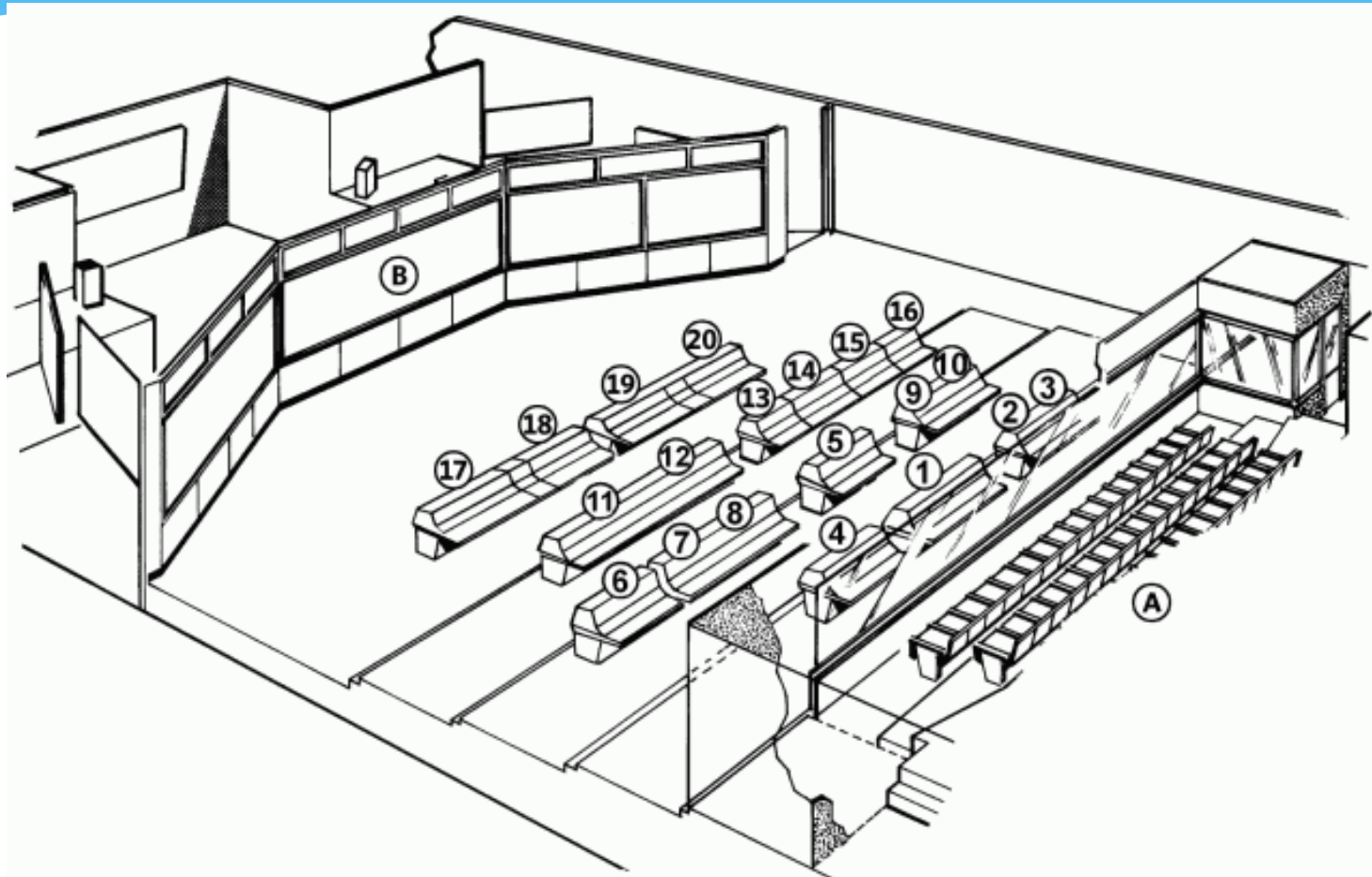
“predictable collective action”



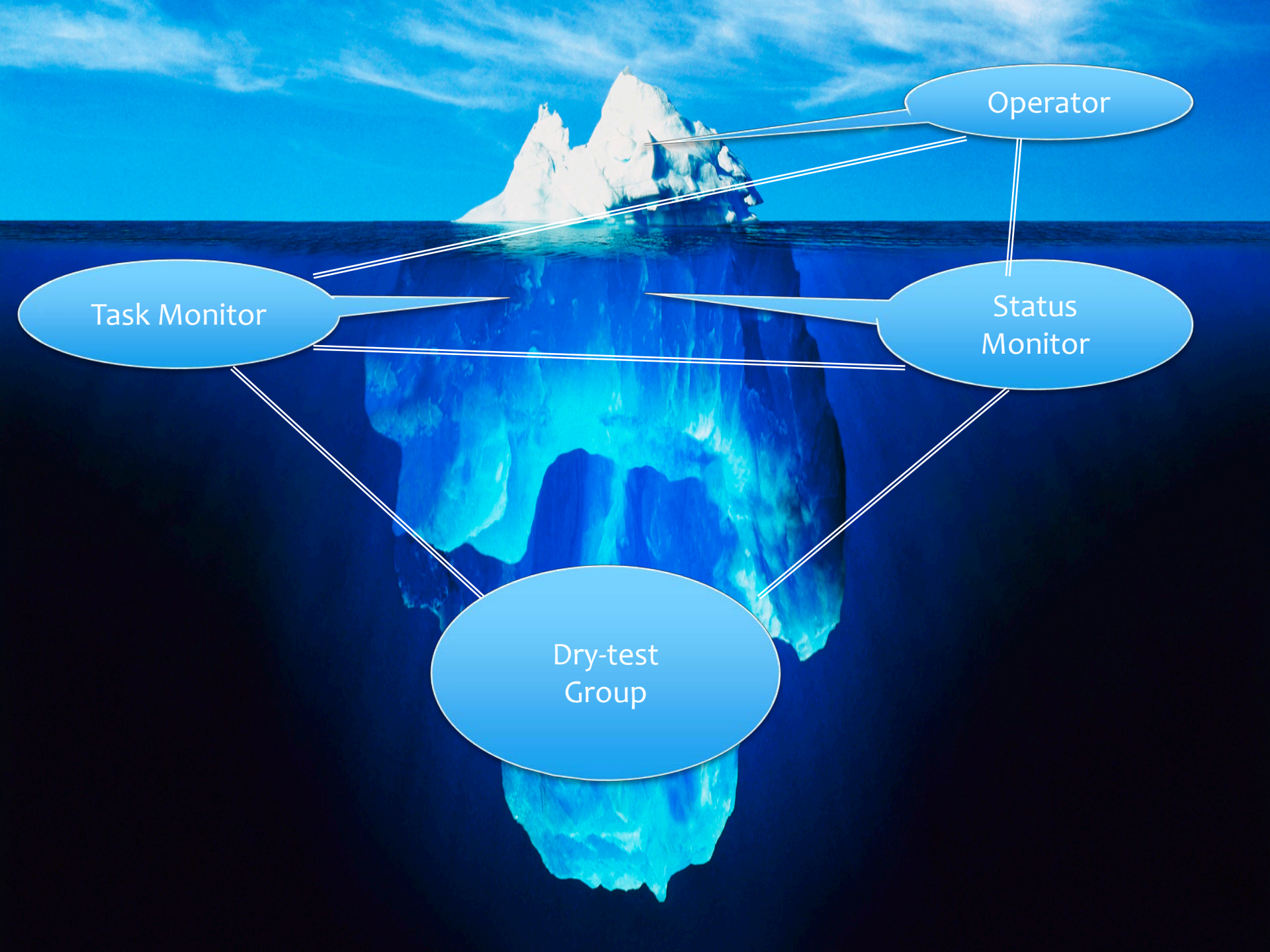
Engineering Emergence

- * 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

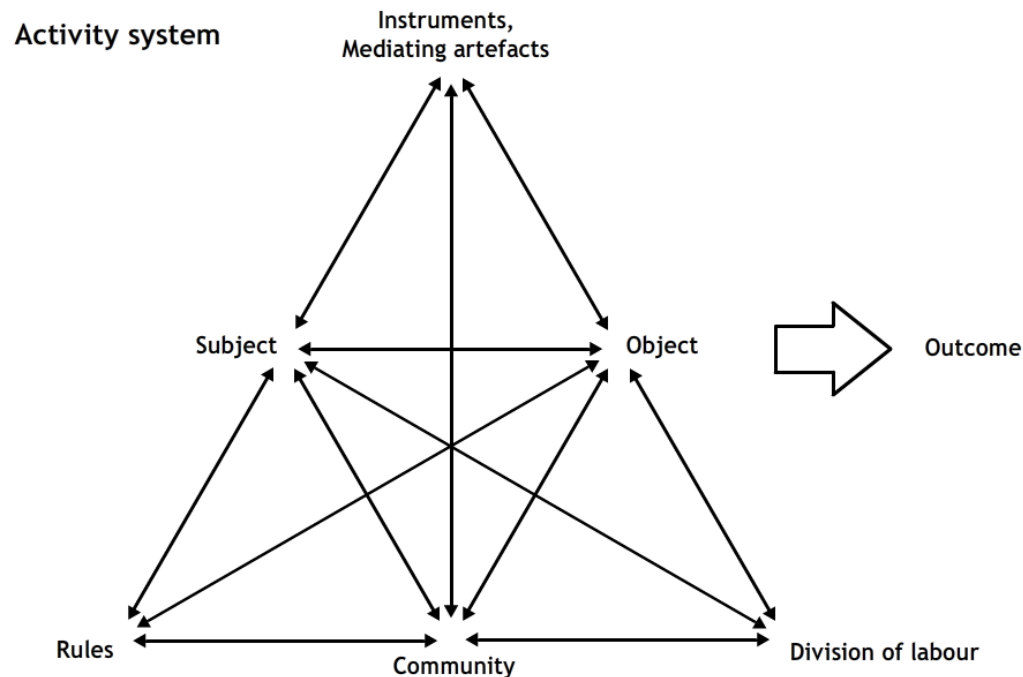


Wave Theory of HCI

- * 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?

