Madeira Interactive Technologies Institute

Missing Models

Understanding Human Activity in the Enterprise

Larry Constantine
University of Madeira

Art

"The Treachery of Images (This Is Not a Pipe)" (1929), by René Magritte

Credit: Los Angeles County Museum of Art © Charly Herscovici / ADAGP / ARS, 2013

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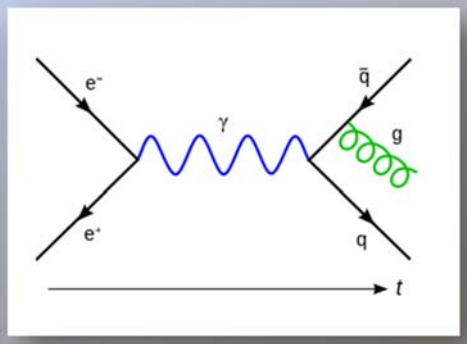
Models

Jon Kortajarena



Feynman Diagram

Úrsula Corberó

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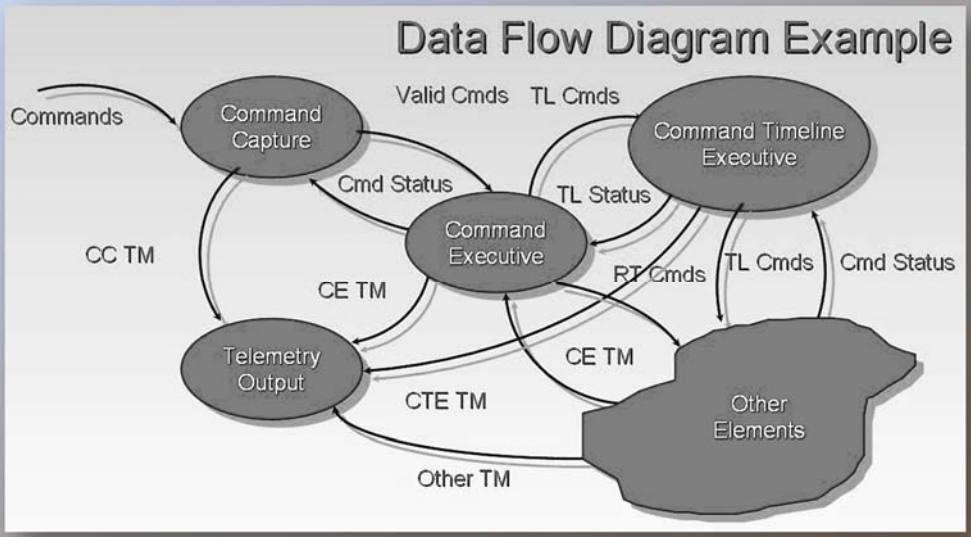
Basic Models:
Mapping Process



Credit: John Azzolini. WikiMedia

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Mapmaking

A map is a guide to a territory.
The map is not the territory.

Catalan World Atlas, 1375

Credit: Bibliothèque Nationale de France; Continental Automotive

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Coastal Science

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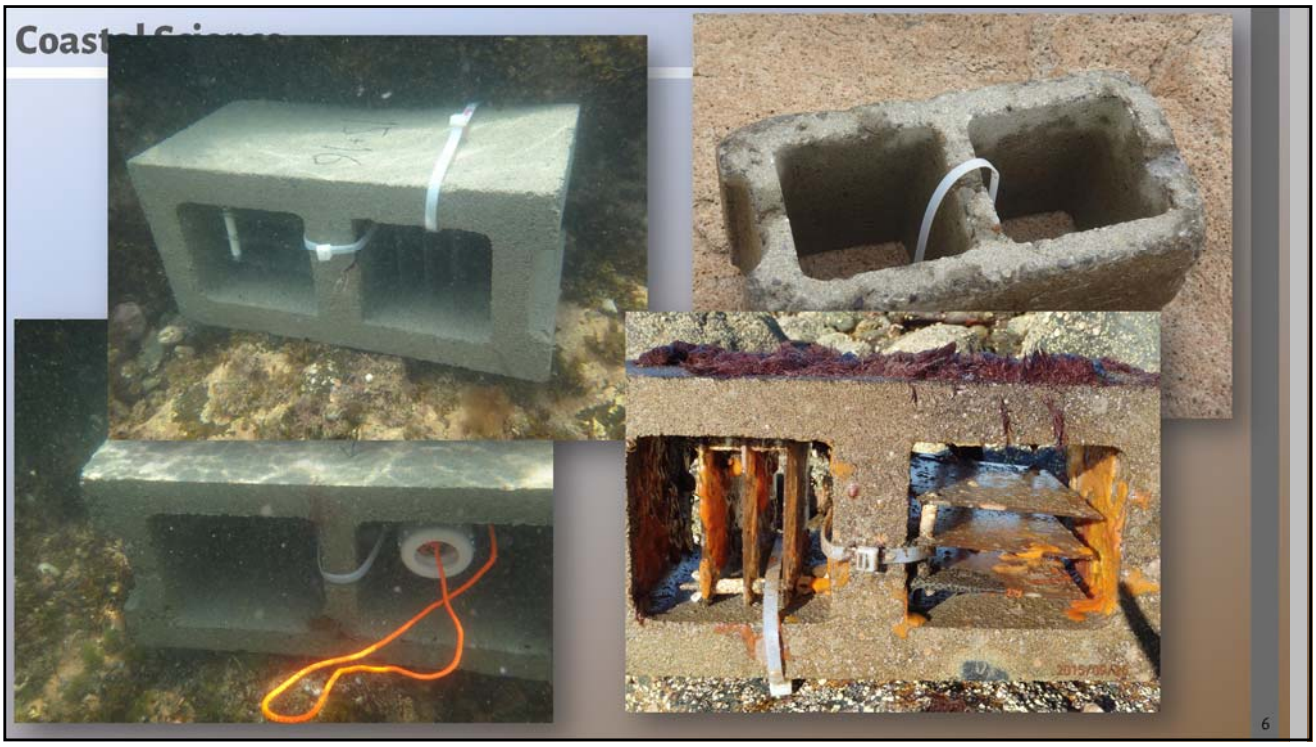
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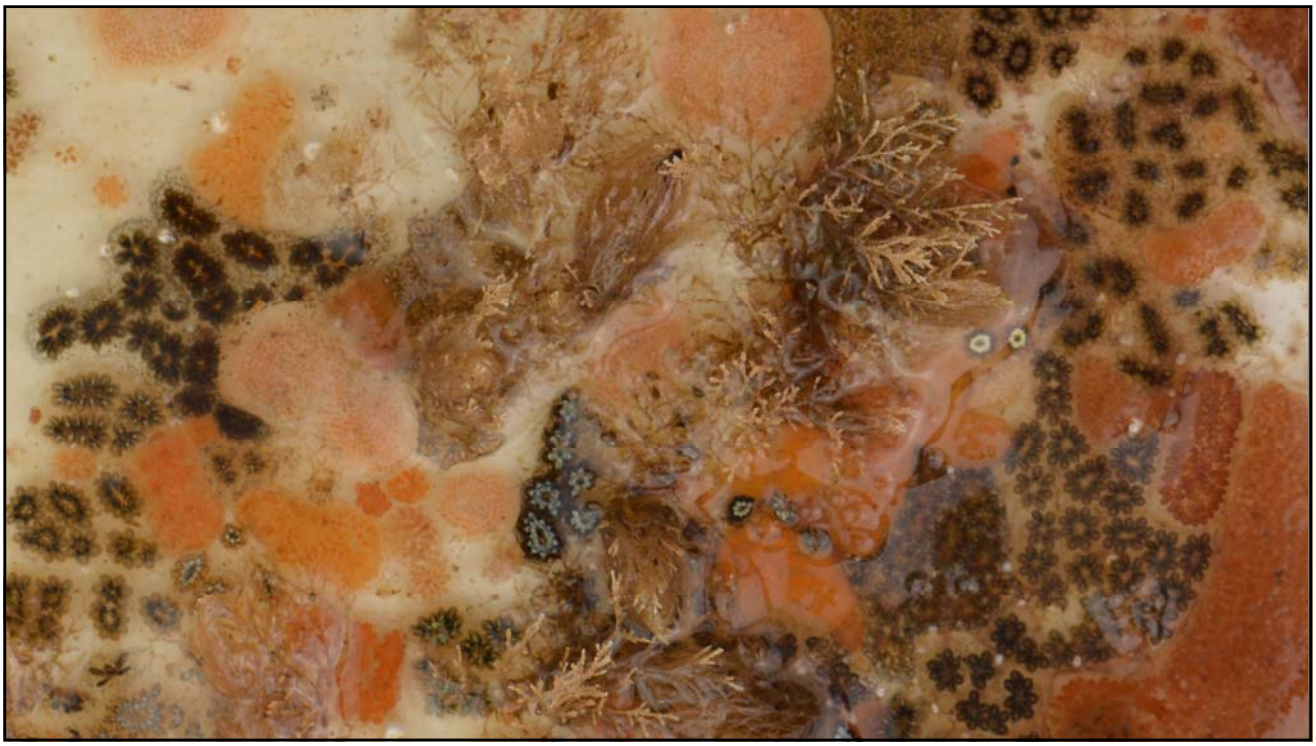
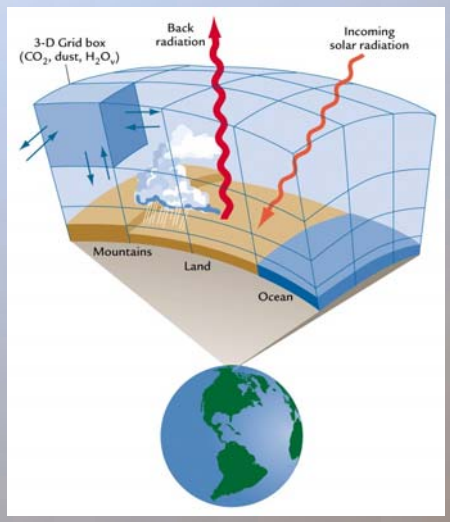
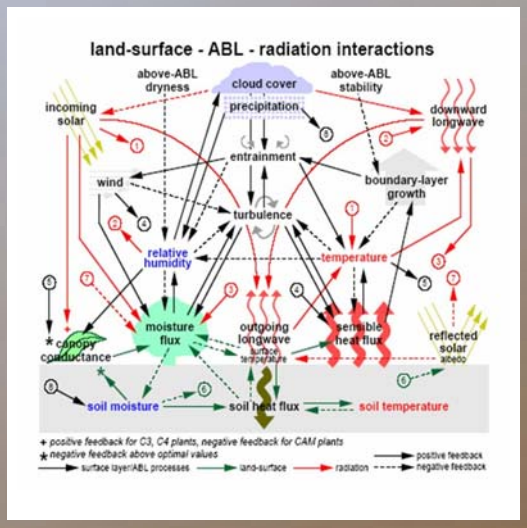


Climate Models

Simple



Not So Simple



Credits: W. F. Ruddiman, 2001, ETH Zurich; Claes Johnson, KTH Stockholm

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Modeling in the Enterprise

Prescriptive

"Research"
Look around, talk with people, think, "workshop".*

→

"Model"
Review info, draw stuff, keep going, ask opinions.

→

"Build"
Code software from model, except when model wrong.

→

"Deploy"
Deliver, keep debugging, modify to work right.

"It's about the code!"

- Objective is to construct systems that improve performance, efficiency, reliability; reduce costs.
- If possible, automate code generation from model: "executable models".

* Sometimes "Model-Driven Inquiry" or "Contextual Inquiry"

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Modeling in Science

Inductive — **Deductive**

"Research"
Systematically gather full data guided by prior theory.

"Model"
Systematically derive formal model/theory from data.

"Hypothesize"
Systematically derive formal, testable predictions.

"Research"
Systematically gather data to prove/disprove predictions.

"Refine"
Explain and revise model (theory) based on new data.

"It's about learning."
- Object is to build knowledge, insight, understanding.
- Ultimately, to build better theory.

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Donald Norman, IDSA

"Focus upon humans detracts from support for the activities themselves."*

"Check out Activity Theory!"

Constantine, "Beyond user-centered design and user experience." 2004

* Norman, "Human-centered design considered harmful." (jnd.org) 2005

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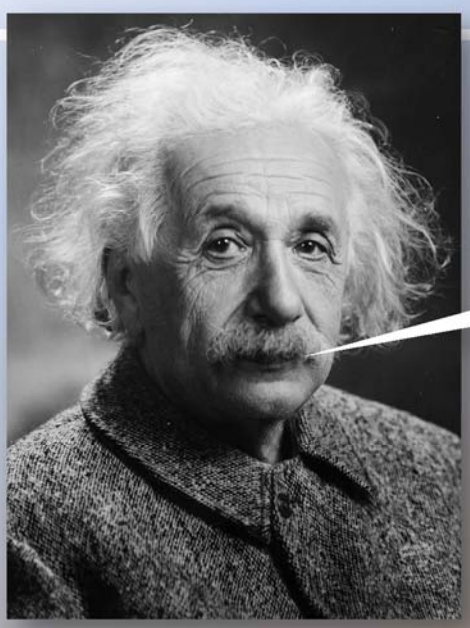

A theory should be as simple as possible, but no simpler.

Photo credit: Oren Jack Turner, Library of Congress

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Activity Theory, Condensed

- Rubinshtein, Leontiev, and Vygotsky; Engeström, Nardi
  - More conceptual framework than theory.
    - Three levels of analysis
      - **activities**: complex, motivated and broadly shaped by overall **purpose** but essentially unpredictable
      - **actions**: directed toward specific conscious **goal** in service of purpose
      - **operations**: means of executing actions, either deliberately or reflexively, adapted to **conditions**

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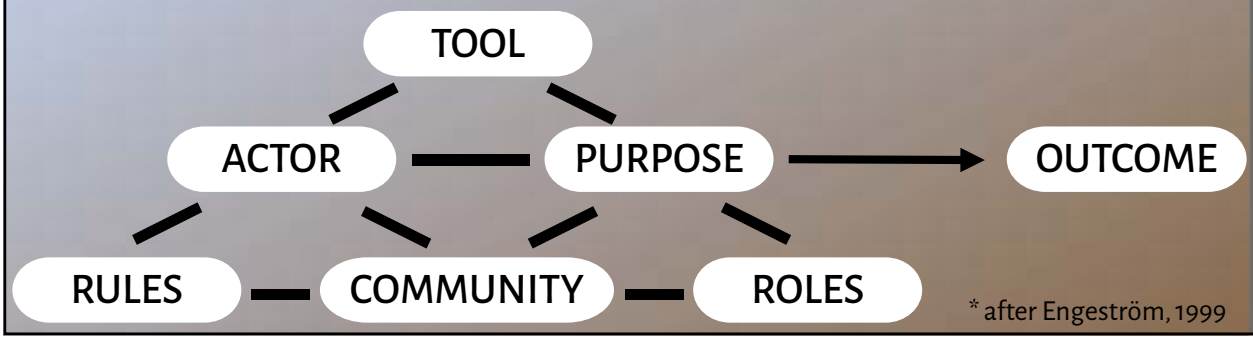
Human Activity

- mediated by **tools** (artifacts)
- performed by **actors** (subjects)
- motivated by **purpose** (object)
- shaped by **rules** and differentiated **roles**
- within a **community** of practice



* after Engeström, 1999

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Human Activity

- All human use of and interaction with designed artifacts of all kinds (tools, objects, services,…) takes place within the context of larger activities.
- Designing for use requires understanding the activity context!
  - Activity modeling is a fast, simple way of understanding the activity context for design.

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Model Agility

- What makes a model agile?
  - Simple, easy to learn
  - Offers shortened, condensed, or simplified form
  - Quickly developed, easily sketched
  - Understandable by multiple constituencies
  - High conceptual leverage, design guidance
  - Suited for index cards, sticky notes, whiteboard, or note paper

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Human Activity Modeling: Three Views

- What is going on and why? **Context Model**
- Who and what is involved and how? **Participation Model**
- How is it done? (And what is needed to help get it done.) **Performance Model**

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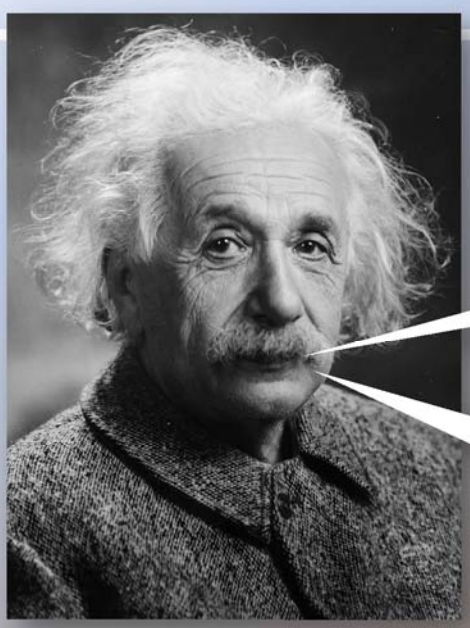

A theory should be as simple as possible, but no simpler.

Also, a modeling notation. Der.

Photo credit: Oren Jack Turner, Library of Congress

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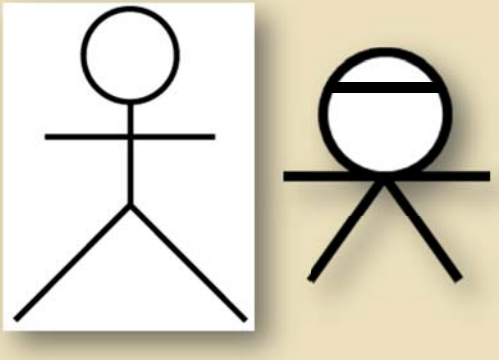
More Art



Esto no es una persona.

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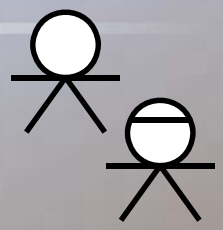
Human Activity Modeling Applied



- interaction design, product design
- service design, service engineering
- multi-model, multi-channel, multi-device
- project management
- organizational change
- education and pedagogy

- practitioners: Helmut Windl, Larry Constantine, Raymond Fisk, Lia Patrício, Leonel Nóbrega, Ko-Hsun Huang, Jorge Teixeira, Eduardo Fermé, Elsa Fernandes …

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Human Activity Modeling:
Three Representations

- **Map**
  - diagrams/graphics representing interrelationships among elements
- **Inventory**
  - simple lists of members/objects
- **Profiles**
  - structured descriptions, simplified collections of salient attributes

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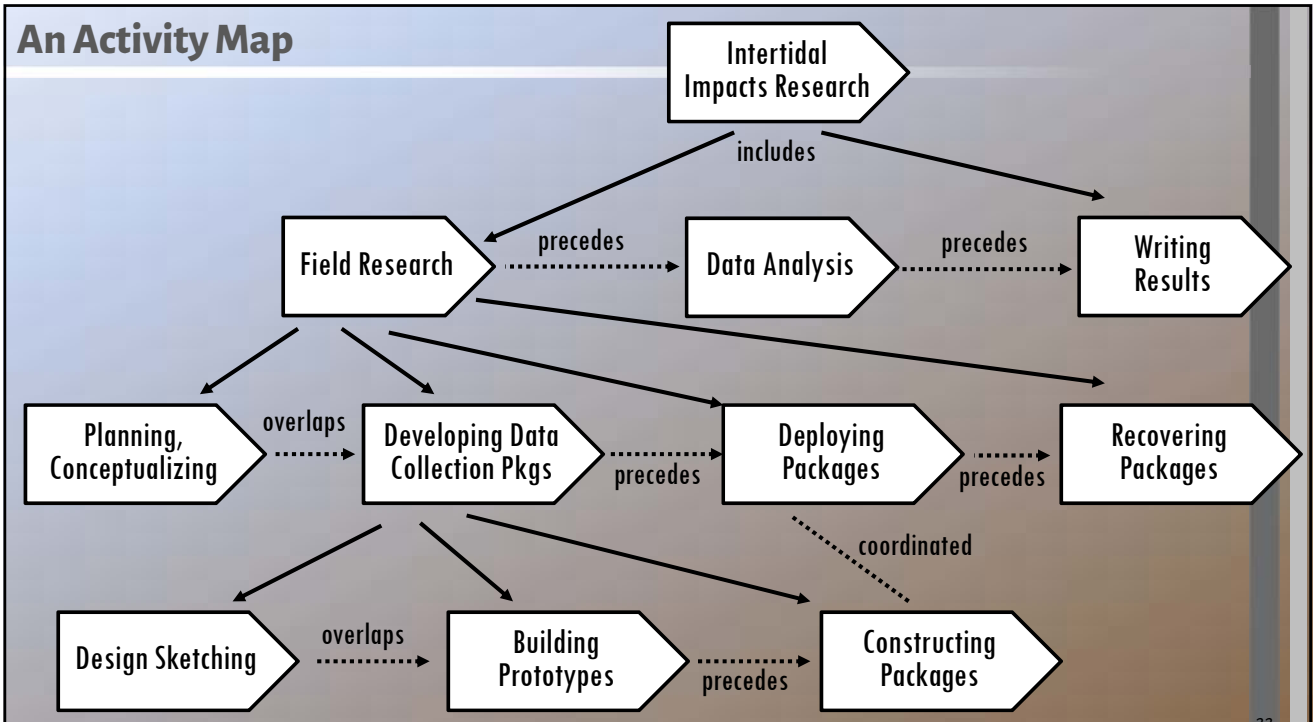
An Activity Map



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Activity Profile

- **Purpose** – motives, objectives
- **Place and Time** – where, when, conditions, context, duration, schedule
- **Participation** – actors and roles, tools and artifacts, system actors, sources and resources
- **Performance Patterns** – formal and informal rules, guidance, characteristic styles
- **Product Implications** – provisional ideas and concepts

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Roles or Personas

a relationship between actors and activities/artifacts
ROLE

PERSONA
a concocted archetypal person

Field Research Assistant

Orientation: *enthusiastic, grade-marked participant, learning*

Responsibilities: *assist researcher, take notes, carry equipment, spotting*

Background: *some knowledge of field methods, environmental science or biology, tech savvy, physically fit*

Stu Marker is a tall, lanky senior in the School for the Environment at UMass Boston. He grew up in Falmouth in a middle-class family with three sisters and two family dogs. He is a highly motivated student and is enthusiastic about his hopes to become the first in his family to graduate from college. He is never without his iPhone, which is loaded with diverse apps and is in frequent use to converse with his girlfriend in New Hampshire. He skis in the winter and sail-boards in summers. He wants to become a teacher after getting his Master's in Education.

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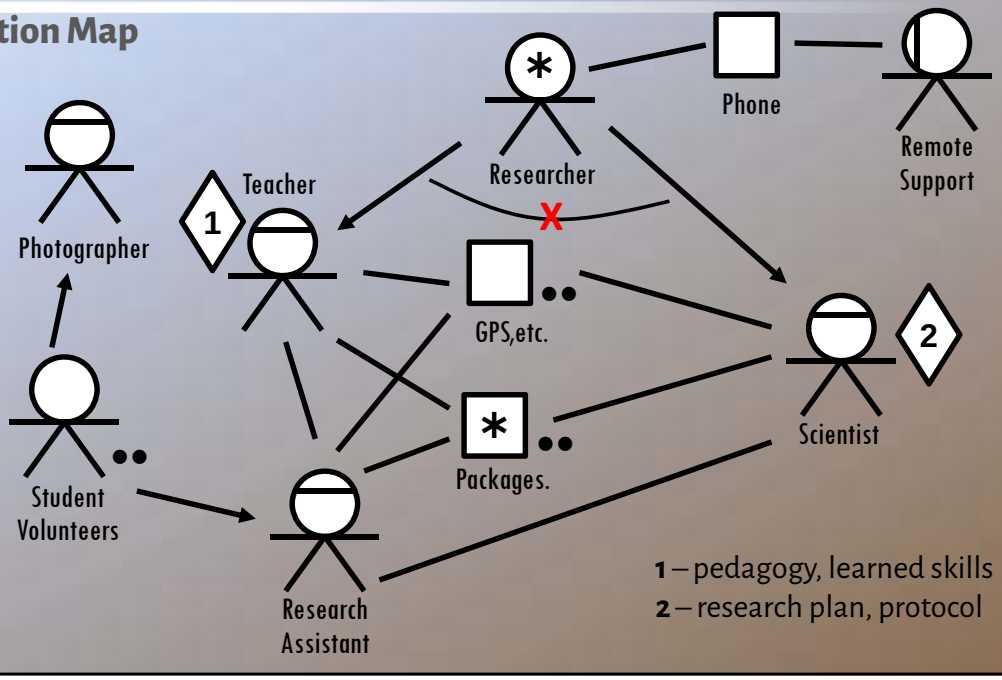
Deploying Data Packages:

Participation Map



1 – pedagogy, learned skills
2 – research plan, protocol

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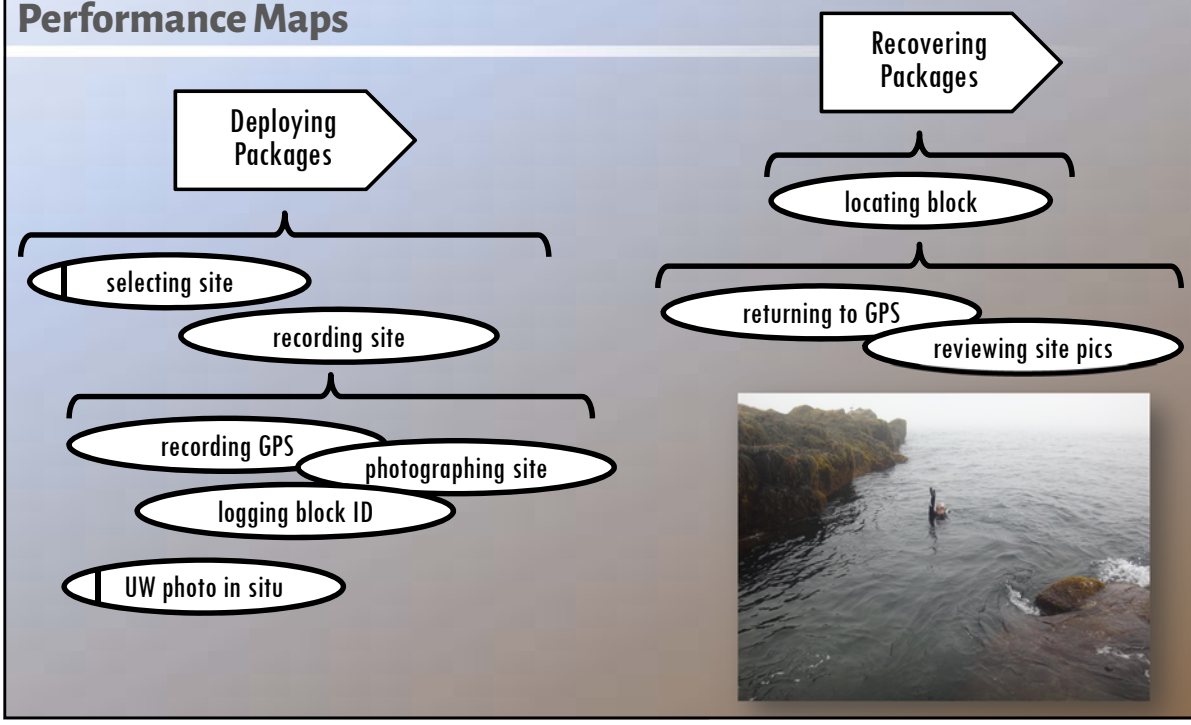
Performance Maps



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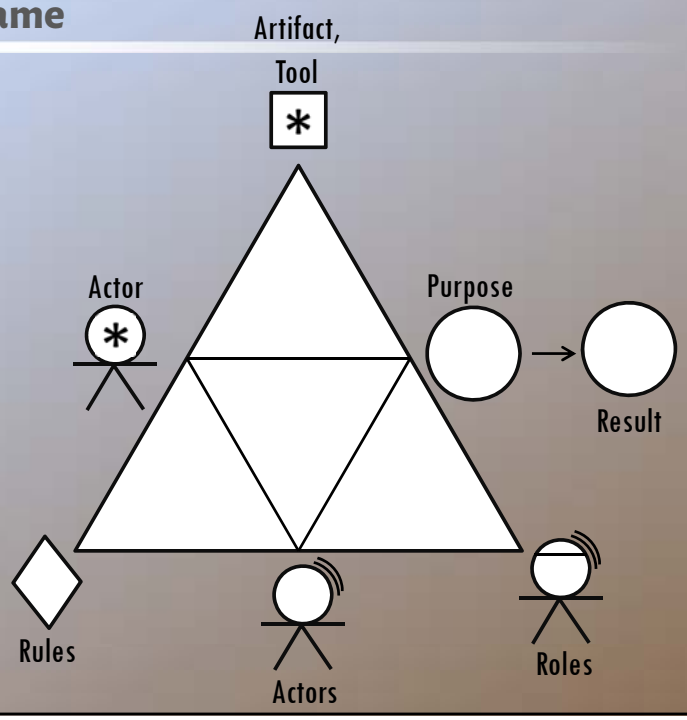
Notation in a Classic Frame



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Human Activity Modeling 3.0


actor, any participant


focal actor


optional participant


actor in role


player, peripheral participant, mediated (indirect) user


artifact, any tool


focal artifact


system actor, non-human active participant


system actor in role


Non-physical Artifact


Non-human actor

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Human Activity Modeling 3.0


any activity


focal activity


target: goal, purpose, objective


alternate symbol


rules, guidelines, conventions, protocols, procedures


alternate symbol


task, task case


relationship, connection


focal task, task case

conflict


action, non-system interaction

temporal relationship

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Why Models?

- Simplify
- Facilitate understanding and insight
- Capture salient detail
- Support generalization and inference

Toward what end result?

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Process or Activity

Activity modeling promotes
- human in control
- flexible performance
- thoughtful system boundaries
- people do what people do best
- software does what software does best

Process modeling promotes
- software in charge
- process embedded in software, executable, simulated
- dumbing down human activity
- complicating the software
- lock-step performance

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Challenges

enable creativity?

Modeling with Intention

?

cut costs?

raise efficiency?

- Think about what you want to accomplish, what the effect/influence of your models will be.

reduce payroll?

track customers?

empower users?

capture customers?

push product?

reduce pollution?

automate processes?

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Modeling for Efficiency?

OR?

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