

# IAT 884

# Tangible Computing

Instructor: Dr. Alissa N. Antle  
Week 3 Conceptual Frameworks  
Spring 2022

# Today

- What is a conceptual framework?
  - More on MCRpd – what is a tangible?
  - Theoretical areas of interest to tangible research and design (Klemmer)
  - Hands-on/share – pick a theory
  - Other frameworks – share
- 
- Workshop 3

# What are concepts?

Concrete



Abstract

Tick

Embodiment

Kitten

Felt experience

Body

Design

Interface

Mapping model

Computer

Fear

# Conceptual Framework

- Framework = kind of theory
- Theory = Model : approximation of some phenomena
- Frameworks show relations between concepts
  - In science, used to classify, describe and explain phenomena
  - In design, used to inspire, inform, generate and prescribe (rarely) designs

# Uses of Conceptual Frameworks

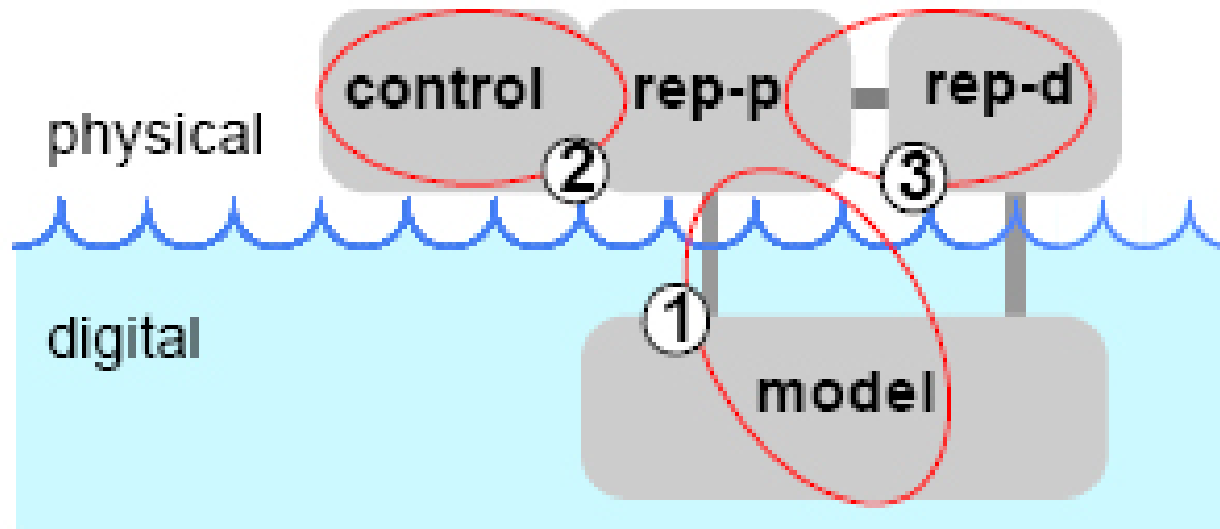
- Identify research gaps
  - How do I situate my research?
- Provide structure and/or ways to understand knowledge during design (humans, interaction, UI)
  - How can I improve designs/implementations?
- Organize data collection and analysis
  - What should I be looking for?
- Frame contribution of research
  - Where have I added knowledge?

# THEORY | CONCEPTUAL FRAMEWORKS

## Types of conceptual frameworks

- Taxonomy (categorize)
- Descriptive
- Prescriptive (guide)
- Explanatory
- Predictive (rarely in design, more often in science)
- Progress over time Categorize → Explain

# MCRpd – visual interaction model



# MCRpd - Key characteristics model

1. Physical representations are computationally linked to underlying digital information through the system model (rep-p – data/operations)
2. Physical representations embody mechanisms for interaction control (control)
3. Physical representations are perceptually coupled to actively mediate (dynamic) digital representations (rep-d)
4. The physical state of the interface artifacts partially embodies the digital state of the system (persistence of physical state).



# Types of Approaches

- Spatial – spatial configuration of objects directly interpreted and augmented by system
- Relational – sequence, adjacencies or other logic relations between physical objects are interpreted and augmented by system
- Constructive – combinations/attaching of objects ...

# What is tangible computing?

5. Involve augmentation (vs replacement) of everyday objects & environments
6. May involve integration of input and output spaces (co-located).
7. Tend to operate at the scale of graspable objects.
8. Often provides multiple access points for multiple users (but is not required to).

# Klemmer paper

Theories that might be useful – generative/inspire and/or inform design and/or evaluation/research.

- Thinking through doing/with hands
  - Epistemic actions – picture face – offload cognition
  - Metaphor – scaffold for abstract thought (learning)
- Performance – hands, memory
- Visibility – social and CSCL
- Risk
- Thick Practice

# Other Frameworks: Share

- What facet of TEI does it apply to (e.g. technology, interaction, experience, physicality, application domain)?
- What can it be used for (abstracting/explanation, designing/generation, building/implementation)?
- How does it connect/relate to the other two frameworks in today's readings?

# Workshop

- Introduction to microcontrollers! Fun.

# Next Week

- Embodiment
- Concept-driven design