Individual and group understanding of energy in an embodied learning activity

AAPT Summer Meeting, Portland, OR
July 21, 2010
Locating ideas in Energy Theater

**Previous talks:**
Ideas about what energy is and does are apparent in Energy Theater.* (define?)

<table>
<thead>
<tr>
<th>Individual level</th>
<th>Group level</th>
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<td>e.g., Energy is located in an object</td>
<td>e.g., The total number of kinetic energy units is increasing</td>
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Locating ideas in Energy Theater

*Previous talks:* Ideas about what energy is and does are apparent in Energy Theater.

Understanding Energy Theater as a learning arrangement includes understanding the interplay of these.

Individual level  ↔  Group level
Person pushing box, frictionless

Chemical energy in hands is transformed into kinetic energy

Kinetic energy increases in the hands and in the box

(No thermal energy transactions)
Person pushing box, frictionless

Signs indicate form of energy (Kinetic, Chemical)
Some C’s need to turn into K’s in the hand and some K’s in the hand need to go to the box, in such a way that the total continually increases in both. How do they know when to do what?
How to know when to do what?

🌟 Observe the special participant.
How to know when to do what?
Ordered tagging says when to do what

Two kinds of tagging

Types of tagging alternate in a routine

Context informs appropriate meaning for tagging

“change from C to K”
“go from hand to box”

“change”
“change”
“go”
“change”
“go”

“How do I move?”

“Which turn was it?”
“What form am I?”
“Where am I standing?”

“Was that a tap or a push?”

Seattle Pacific University
ENERGY PROJECT
FACET INNOVATIONS
Cognitive function of tagging

Does tagging “help people remember what to do”? 

No. An individual’s memory task is reduced, not increased, by the tagging.

The “remembering” function is performed by the tagging algorithm, not individuals.

Similarly, signs and floor markings “remember” individuals’ identity.

Hutchins “Cockpit,” 1995
Tagging is a cognitive function located in biological brains.

Cognitive function located in tagging algorithm.

Hutchins “Cockpit,” 1995
Status of special participant

“What kind of energy is that?”

“She’s the nervous system.”

Sends message from cognitive center to body parts
Status of special participant

Cognitive center = tagging algorithm

“She’s the nervous system.”

Sends message from cognitive center to body parts

Body parts = embodied actors
Letting cognition out of the head

- Allows and promotes direct observation of information being processed
- Helps us appreciate who/what is responsible for which aspects of information processing
- Allows cognitive properties of systems to be distinct from those of a biological brain
- Helps us enjoy and seek different scales of meaningful activity in collaborations
What is learning if not in the head?

How might we measure cognitive progress?

Change in information representation

Inward flow of people from legitimate peripheral participation to central participation