Bridging the cognitive and situative accounts of cognition with a resources framework

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ABSTRACT — There are ongoing divisions in the learning sciences between perspectives that treat cognition as occurring within individual minds and those that treat it as irreducibly distributed or situated in material and social contexts. We contend that accounts of individual minds as complex systems are theoretically continuous with distributed and situated cognition. On this view, the difference is a matter of the scale of the dynamics of interest, and the choice of scale can be informed by data. In this paper, we propose heuristics for empirically determining the scale of the relevant cognitive dynamics. We illustrate these heuristics in two contrasting cases, one in which the evidence supports attributing cognition to a group of students and one in which the evidence supports attributing cognition to an individual. Rather than describe learning in terms of "transfer," we use "activation" of cognitive resources as the central theoretical construct.

We espouse a view of cognition that bridges the cognitivist, situated, and distributed views of cognition.

Cognitivism

Unit of Analysis:
The individual mind

"The cognitive perspective takes the theory of individual cognition as its basis and builds toward a broader theory by incrementally developing analyses of additional components that are considered as contexts."
(Greeno, 1997)

Situated Cognition

Unit of Analysis:
The individual-in-a-setting

"The situative perspective takes the theory of social and ecological interaction as its basis and builds toward a more comprehensive theory by developing increasingly detailed analyses of information structures in the contents of people's interaction."
(Greeno, 1997)

Distributed Cognition

Unit of Analysis:
A culturally constituted functional group

"This unit of analysis must permit us to describe and explain the cognitive properties of the cockpit system that is composed of the pilots and their informational environment. We call this unit of analysis a system of *distributed cognition*."
(Hutchins & Klausen, 1996)

Resources, Framing & Transfer

Resources – cognitive elements which can be activated
– Resources come in all sizes, from fine-grained intuitions to well-formed concepts and stances.

Frames – stable, coherently activated networks of resources
– interpretive framework; "what is going on here?"
– structures of expectations

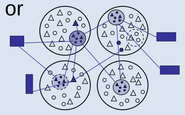
"Transfer"– activating a pattern of resources that formed as a pattern in a different context.

A Dynamic Unit of Analysis

Fames can involve resources within individuals or across multiple individuals and/or materials

The unit of analysis occurs at the level of the coherent cognitive patterns.

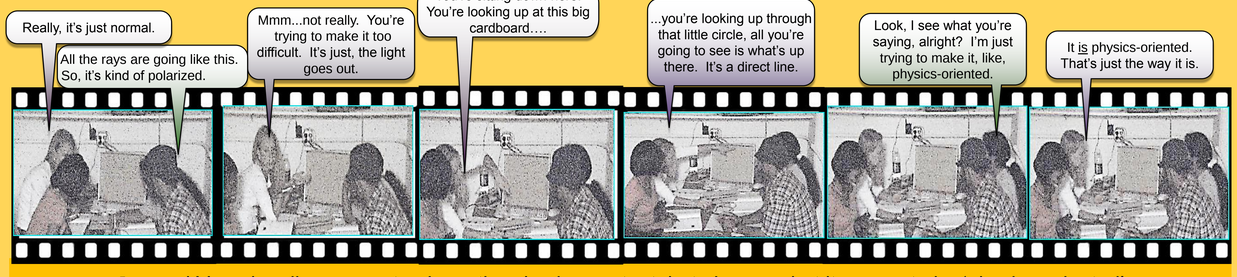
Thus, the unit of analysis is dynamic and evolving.



The resources & framing account affords the unit of analysis to be gleaned from empirical considerations, rather than *a priori* theoretical commitments.

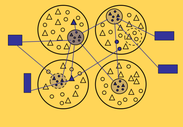
Data Analysis

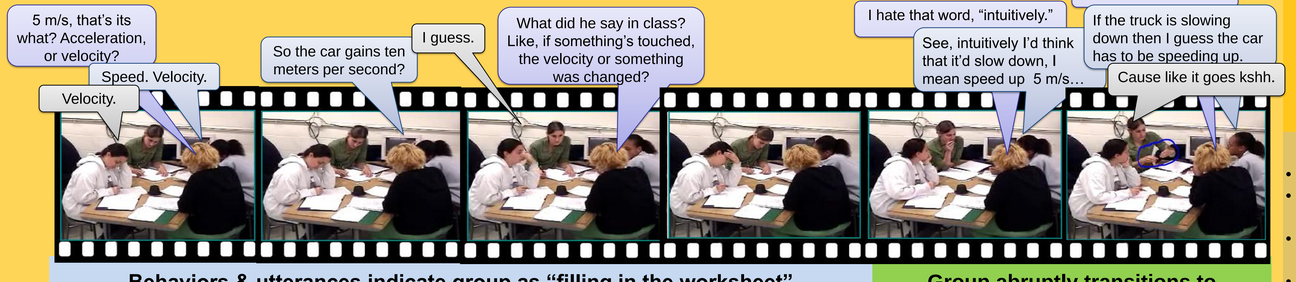
cognitive unit:
The individual
Each person has their own stable epistemological frame.
(Lising & Elby, 2005)



Jan and Veronica disagree not only on the physics content, but also on what it means to be 'physics-oriented'

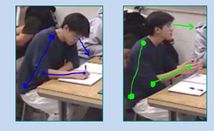
cognitive unit:
The group
The group transitions abruptly between shared epistemological frames.
(Scherr & Hammer, 2009)





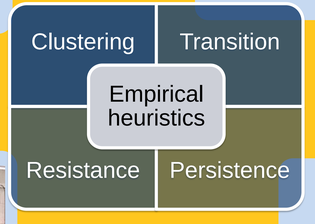
Behaviors & utterances indicate group as "filling in the worksheet"

Group abruptly transitions to "Having a discussion"

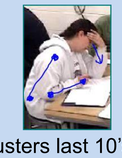


Gaze, posture, and gesture tend to cluster

Abrupt transitions between stabilities



A mismatch suggests a 'bid' to change activity



Clusters last 10's to 100's of seconds

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