HS 525: Cognitive, Sociocultural and Critical Foundations of the Learning Sciences

Lecture 6: August 23, 2025

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Reflection

One thing I learned last time…

1. How they're not mutually exclusive

One thing I found challenging last time…

1. Understanding real situations and which metaphor

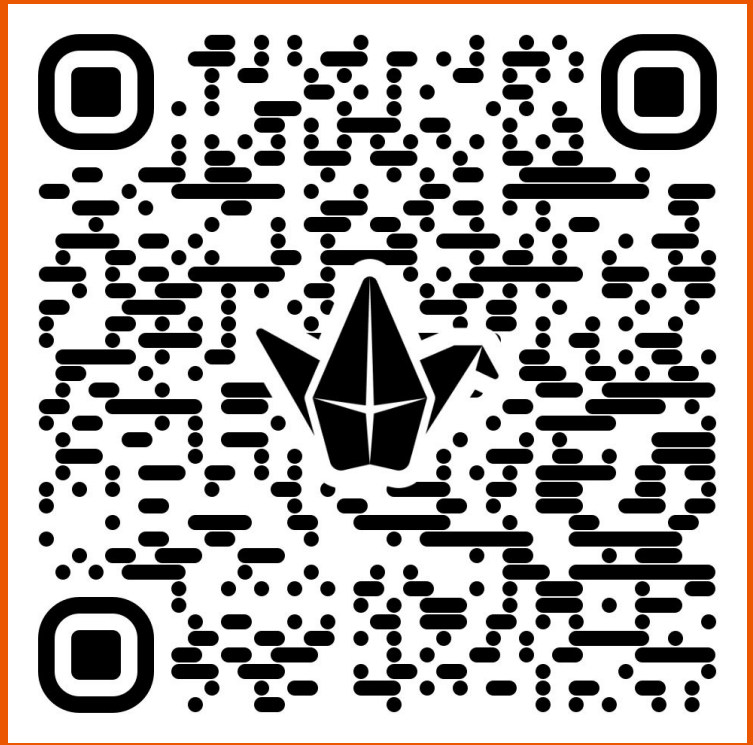
http://netlogoweb.org/launch#http://netlogoweb.org/assets/modelslib/Sample%20Models/Biology/Wolf%20Sheep%20Predation.nlogo

Predators and Prey: (Pairs, 10 mins)

1) Set up the model so the sheep or the wolf grow unbounded.
2) What happens if either the sheep or the wolf grow unbounded?

Predators and Prey: (Pairs, 10 mins)

1) What did you learn?
2) How did you learn (list the processes)?



https://padlet.com/sameerss/discussion-topic-goes-here-44voqbameu666cb9

Share

What

How (List the processes …)

How did you learn?

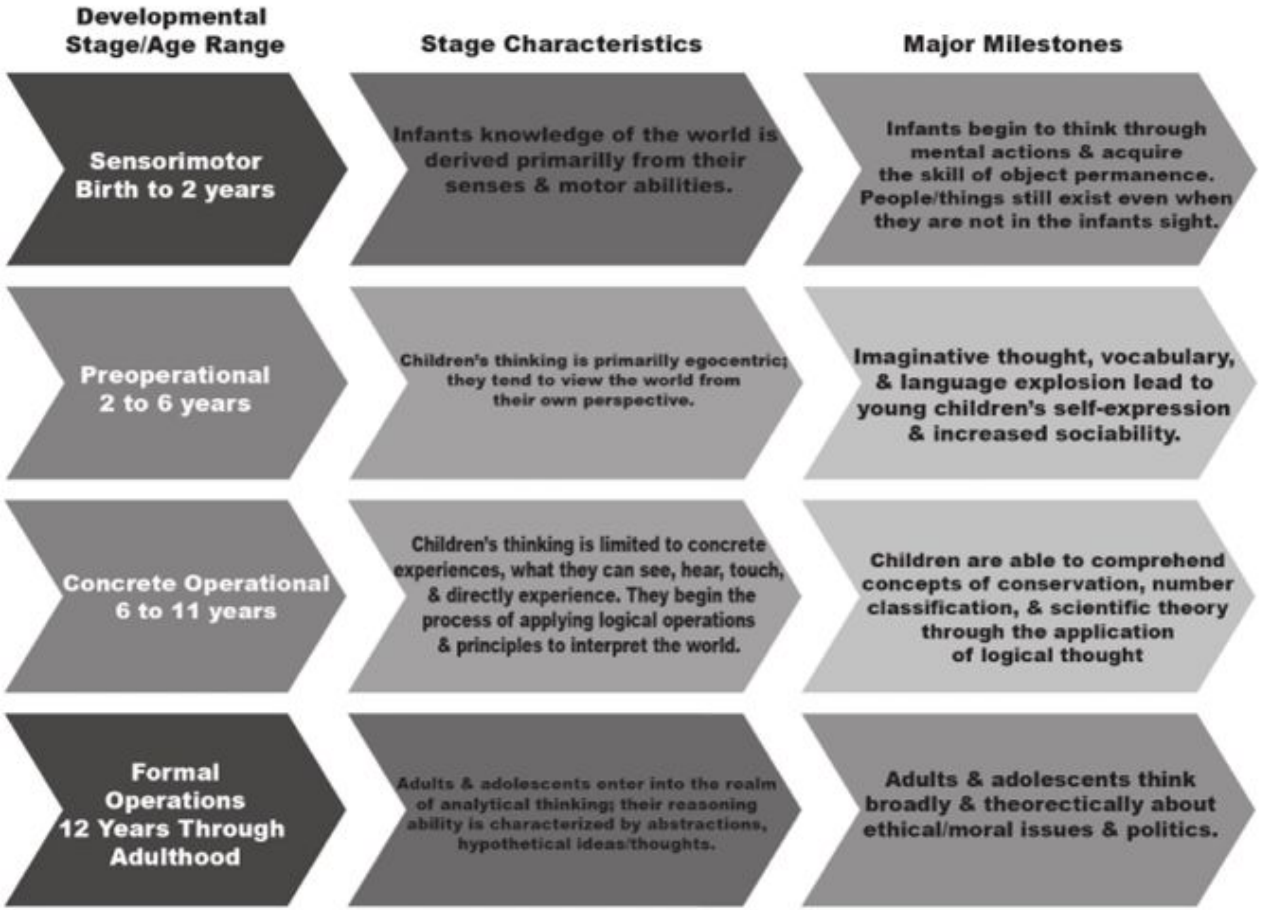
- Making sense of new material by paying attention to relevant information, organizing and connecting it to what you already know.
- Experience or trial & error and **reflecting** on experience.

What is constructivism?

- Knowledge does not have a one-to-one correspondence with reality; there is no objective knowledge *out there*.
- Knowledge is constructed by each individual; it “corresponds more and more closely to an external world”.
- Knowledge is tied to action and is not for describing the environment.
- The *quality* of knowledge is not assessed by how well it matches with reality, but by how successful it is for understanding the environment.
- *An individual is an interpreter of experience, and this interpretation helps them structure the world.*

Stages of Development

(https://ebrary.net/191355/sociology/piaget_s_theory_cognitive_development)



Object permanence

Stages of development

Schemes

- All children are born with a basic mental structure over which all subsequent learning happens
- “a cohesive, repeatable action sequence possessing component actions that are tightly interconnected and governed by a core meaning.” (Piaget, 1952)
- Linked mental representations of the world, used for explaining perception/ experience -> equilibrium
- “Units of knowledge” - Building blocks of intelligent behaviour, a way of organizing knowledge.
- Set of “index cards” - objects, actions and abstract concepts
- Become more in number and complexity with development
- Can be combined logically to accomplish a task
- Strengthened or corroborated by the actions of others.

1 2 3

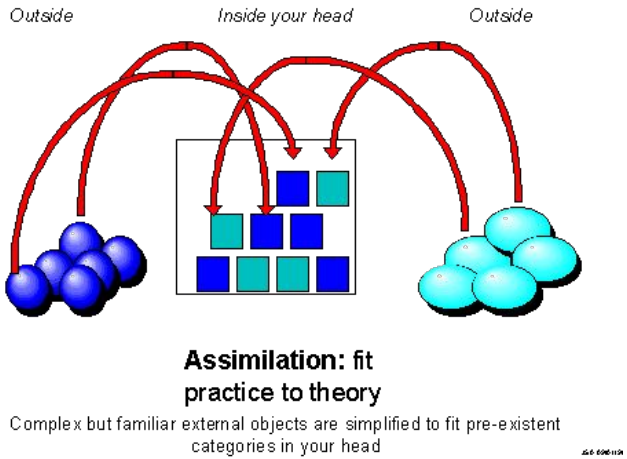
PERCEIVED SITUATION -> ACTIVITY -> BENEFICIAL or EXPECTED RESULT

Examples of schemes

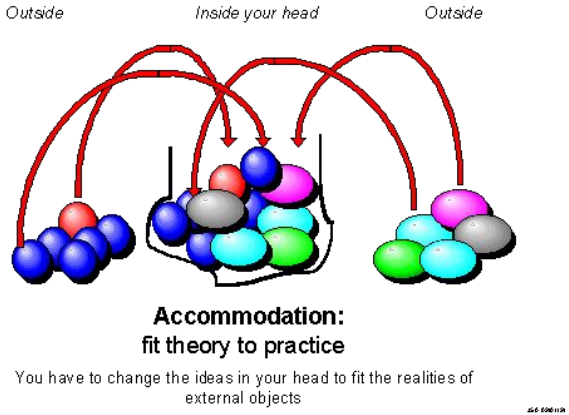
- Grasping a bottle
- Making tea
- Converting word problems into numbers/equations
- (think of your own schemes)

Adaptation via Assimilation, Accommodation and Equilibration

Assimilation: incorporate new concepts into existing mental structure



Accommodation: New object doesn't fit existing mental structure; adaptation



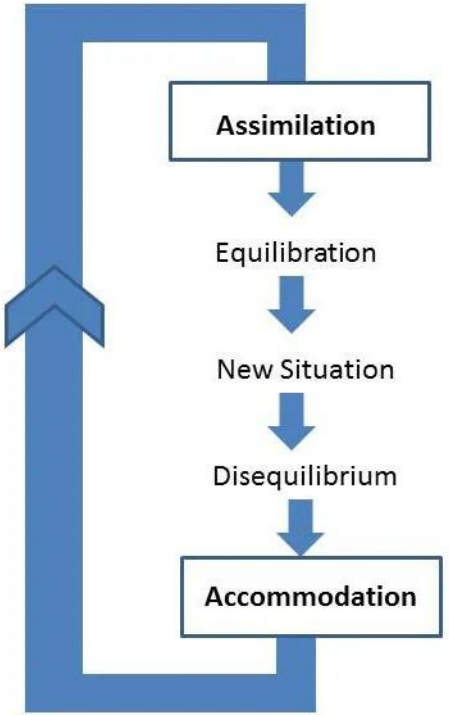
COGNITIVE CONFLICT OR DISEQUILIBRIUM

http://acbart.com/learningandteaching/LearningAndTeaching/www.learningandteaching.info/learning/assimacc.htmll

Adaptation via Assimilation, Accommodation and Equilibration

New situation encountered

- Assimilation: The situation “appears” similar to an existing scheme - activity is performed - expected result obtained
- Equilibrium: Existing scheme explains perceived situation
- Accomodation: The activity doesn’t lead to the expected result -> disequilibrium, *directs attention back to the situation*
  - Modify perceptual requirements or activity
  - Form new scheme
- Return to state of equilibrium
  - Dynamic state



https://www.simplypsychology.org/piaget.html

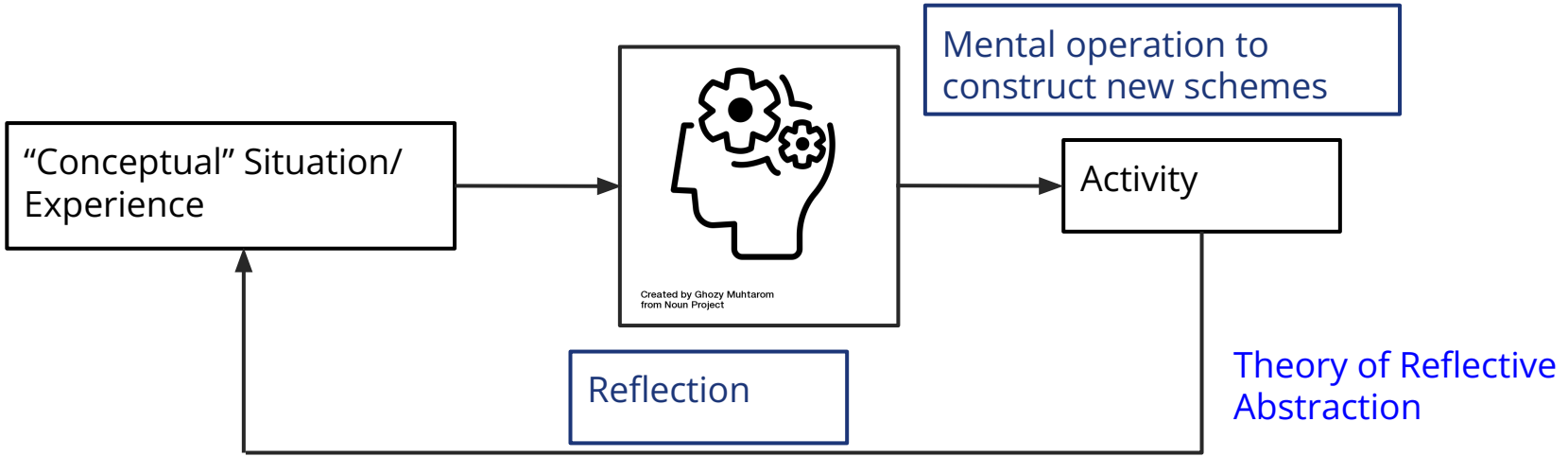
Importance of cognitive conflict

Disequilibrium caused when expected result not obtained

"Unpleasant" feeling -> Motivation for learning

Cognitive Conflict -> "relational surprises" -> awareness of holding two contradictory views about the situation -> rethink view of the world

Modify existing schemes -> learning



Conditions for learning

- Tendency to have repetitive experiences
- Remembering and retrieving (re-presenting) experiences
- Make comparisons and judgements of similarity and differences between experiences
- Elementary values - preferences, likes
- Knowledge: Conceptual structures created by epistemic agents that they consider “viable” given their current range of experience with thinking and language
- Learning and knowledge are instrumental - Utilitarian (action schemes) / epistemic (operative schemes)

Language and communication

- Engendering understanding
- Building blocks of individual conceptual structures - abstracting from individual experience
  - Focusing visual attention
  - Isolating visual signals and forming a visual item or thing
  - Isolate auditory signals
  - Associate with isolated visual item
- Meaning is subjective
- Understanding is a matter of fit
  - Compatibility between conceptual structure and the structure of the words or text
- Language can be used for constraining and orienting conceptual structures