
Intro to Learning Sciences

Lecture 15: October 7 and 9, 2025

Aditi Kothiyal

Midsem reflection



Midsem recap: Part A

5. Sfard warns against choosing only one metaphor of learning. What risk does she highlight?

- a) Learners may resist technology
- b) Theories may become fragmented
- c) **Important aspects of learning may be overlooked**
- d) Transfer of learning becomes impossible

Midsem recap: Part B

2. Lave and Wenger argue that learning is an "emerging property" of a person's legitimate peripheral participation in communities of practice.
5. In the framework of cognitive apprenticeship, a teacher might use modeling to explicitly demonstrate their expert thought processes to a student.
6. Vygotsky's work emphasizes that the development of human psychology involves the internalization of culturally and historically developed activities.
7. A core principle of the learning sciences is to take a holistic view of human learning, considering individuals within their broader physical, social, and technological spaces.

Midsem recap: Part C.1 (Average 12/18)

- Very few of you noticed it was cognitive apprenticeship
- Alternate responses - constructivism, constructionism - part marks for this
- Features - modeling, coaching, scaffolding, articulation, exploration, reflection - any 3 got full marks
- Part marks for correct alignment to the theory mentioned in question 1

Midsem recap: Part C.2 (Average 14/18)

- Most of you correctly identified RKA as learning through participation and the rest as learning through acquisition
- 3 principles of constructivism or constructionism got full marks, part marks otherwise

Midsem recap: Part C.3 (Average 11/18)

- Very few of you explicitly wrote down all components of both AS
- Expansive learning process to be explained (primary contradiction - questioning, secondary contradictions - historical and empirical analysis, modeling, tertiary contradictions, reflection, consolidations) - part marks for missing few steps

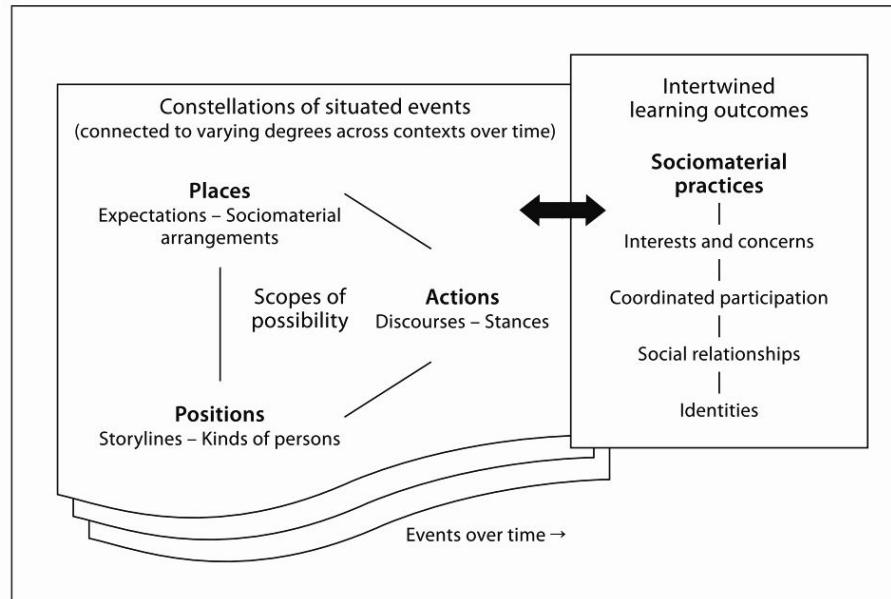
Midsem recap: Part D (Average 9/16)

- Missing theory in student activities - part marks
- Teachers role explicitly not mentioned - part marks
- What would you assess and how? How was missing for a lot of you.

Learning Pathways

- Learning as a cultural process
- “...learning as occurring along culturally organized learning pathways—sequences of **consequential participations and transitions** in learning activities that **move** (or do not move) one towards greater social recognition as **competent** in particular learning **domains and situations.**”
- Learning Pathways:
 - Interplay of identity and learning, identity has relational, affective, motivational components
 - Consist of cultural practices and routines, socially constructed, multiple instances and extended time periods
 - Enactments of privilege and marginalization, structural constraints and supports

Cultural learning pathways theoretical framework



What did we do last time?

- Three characteristics of learning pathways
 - Relational, affective and motivational components
 - Social and cultural practices
 - Enactments of privilege and marginalization
- Pathway as trodden path - our path based on social and cultural practices
- Extended time period and multiple intervention - Constellation of events, across events
- Tools are part of cultural activities, practices
- Facilitates and constrains
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Learning Pathways

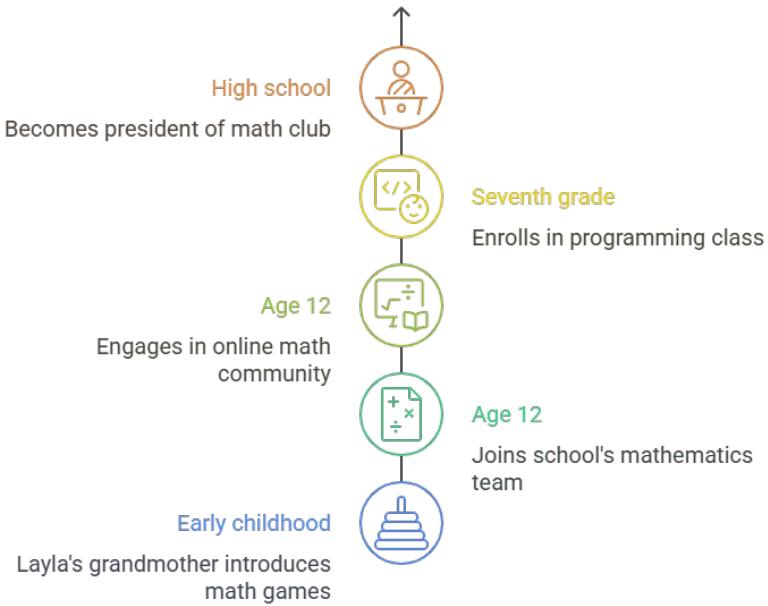
- Changing socioeconomic status can change the lifelong learning trajectory and outcomes for individuals and communities because of changes in learning environments and cultural values
- Pathways are enabled or constrained by the cultural, ecological niche in which they are embedded
- Consider individual participation over longer stretches across the lifespan, varies with situated conditions that also change at different time scales
- Individuals have some choice of frames and pathways, but they are not infinite and access to them depends on history, geography and politics



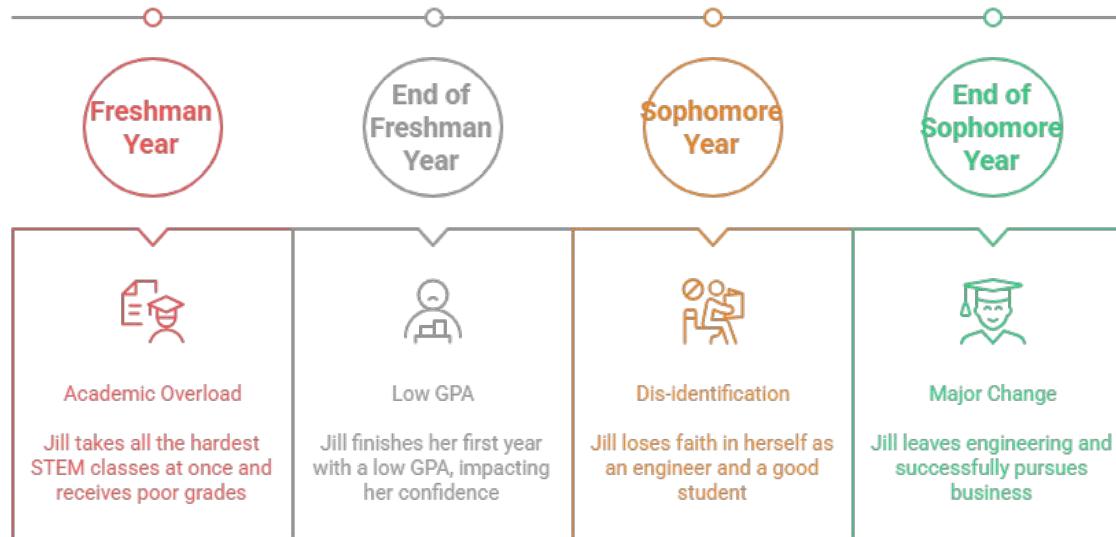
Learning Pathways

- “Trajectories of identification” - *prolepsis*- interactions with social and cultural contexts depend on perceptions of the past, present and future
 - Project into the future, based on the past, which shapes present interactions
- Identity - how one sees oneself and one’s place in the world and connection to others - bidirectionally affects how one engages with learning settings
- Shifts the unit of analysis from learning outcomes to specific and consequential learning resources or experiences (social and cultural activities) that learners are able to access
- How learners access to such resources subsequently shape the learning dispositions and pathways that they form

Layla's journey in math and computing



Jill's pathway in engineering



Online Science Clubs

A teenager actively participates in an online forum dedicated to astronomy. They learn by reading posts, sharing photos from a home telescope, and asking for feedback from global peers. Occasionally, they organize virtual stargazing nights with others and learn how astronomy practices and knowledge can differ depending on cultural observances and available technology in different countries. In groups analyse -

- The settings (where learning happens)
- The social practices (what kinds of activities, interactions)
- The cultural resources and norms shaping participation
- The learning pathways evident in the scenario

Create a visual “learning pathway map” showing how the learner moves across settings and participates in different social practices. Highlight connections, transitions, and barriers/opportunities for learning.

Contrasting Learning Theories

Question	Constructivism	Constructivism	Sociocultural theory	Social/ Situated learning	Expansive learning	Learning Pathways
Who is learning?	Single person	Single person	Single person	Single person	Activity system	Single person (Activities as UoA)
Why do they learn?	To resolve cognitive conflict	Self-interest and motivation	To solve problems in the course of practical activity	To engage in and contribute to the practices of the community, to develop an identity and belong to a community	To resolve contradictions	To learn sociomaterial practices of a community, to foster their interest, to develop an identity

Contrasting Learning Theories

Question	Constructivism	Constructionism	Sociocultural theory	Social/ Situated learning	Expansive learning	Learning Pathways
What do they learn?	Concepts or skills	Concepts and skills	Concepts or skills	How to do the practices of the community, make meaning of one's experiences,	New objects, new patterns of activity, new perspectives and understanding of the history and contradictions in the AS	Goal-oriented practices
What does it mean to learn?	Build schemas	Be able to make things	Be able to do things beyond their current capabilities with support	Develop an identity, belong to a community, be able to do practices and make meaning	New form of societal activity that is a solution to the contradictions seen in current everyday actions	Developing an identity and being recognized as competent in a particular domain or situation

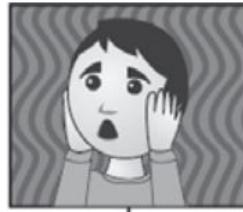
Contrasting Learning Theories

Question	Constructivism	Constructionism	Sociocultural theory	Social/ Situated learning	Expansive learning	Learning Pathways
How do they learn?	Connecting to prior knowledge through assimilation /accommodation and reflective abstraction	Making something concrete, making connections with prior knowledge	Mediating artifacts, social interaction, zone of proximal development	Legitimate peripheral participation in the practices and moving inwards through increased authentic participation	Zone of proximal expansion	Along culturally organized learning pathways, through sequences of consequential participations in learning activities that move the learner towards greater social recognition as competent

How do the learning theories reconcile?



Which theory?



$+ 10^{-2}$

$+ 10^{-1}$ to 10

10^2 to 10^4

10^5 to 10^7

$+ 10^8$

milliseconds
& below

BIOLOGICAL

seconds

COGNITIVE

minutes
to hours

RATIONAL

days to
months

SOCIOCULTURAL

years &
beyond

ORGANIZATIONAL

Constructivist
Constructionist
Sociocultural

Situated/
Sociocultural
Expansive

Expansive
Learning Pathways

Where are the tension points between the learning theories which make them irreconcilable?

Where are there assumptions that contradict each other?

- 1) Purpose of establishing IITs - acquisition vs participation
- 2) Constructionism - learn by doing - concrete to abstract; sociocultural theories - practice is primary, culture is a mediator for abstraction, for learning - inputs vs constitutive views