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

Lectures 9 and 10: September 2 and 4, 2025

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Reflection

One thing I learned last time…

1. Social learning theory by Bandura and Vygotsky
2. Legitimate peripheral participation - moving towards more competence through active engagement/participation in the community
3. Participation in multiple communities of practice

One thing I found challenging last time…

1. Is expertise in multiple communities of practice possible?

[RECAP] A social theory of learning

1. We are social beings.
2. Knowledge is a matter of competence in valued enterprises.
3. Knowing is a matter of participating in the practices of such enterprises ⇔ active engagement and constructing identities.
   a. Participation shapes what we do, who we are and how we interpret what we do
4. The goal of learning is meaning ⇔ our ability to experience the world and our engagement with it as meaningful
5. Components:
   a. Meaning, Practice, Community, Identity
   b. Identity and practice are centered
6. Communities of practice are everywhere

[RECAP] Think: How does constructivism connect with social theory of learning? (Individual, 3 min)

https://padlet.com/sameerss/think-individual-5-min-is-constructivism-related-to-the-soci-86p5fxk7mutqbuqg

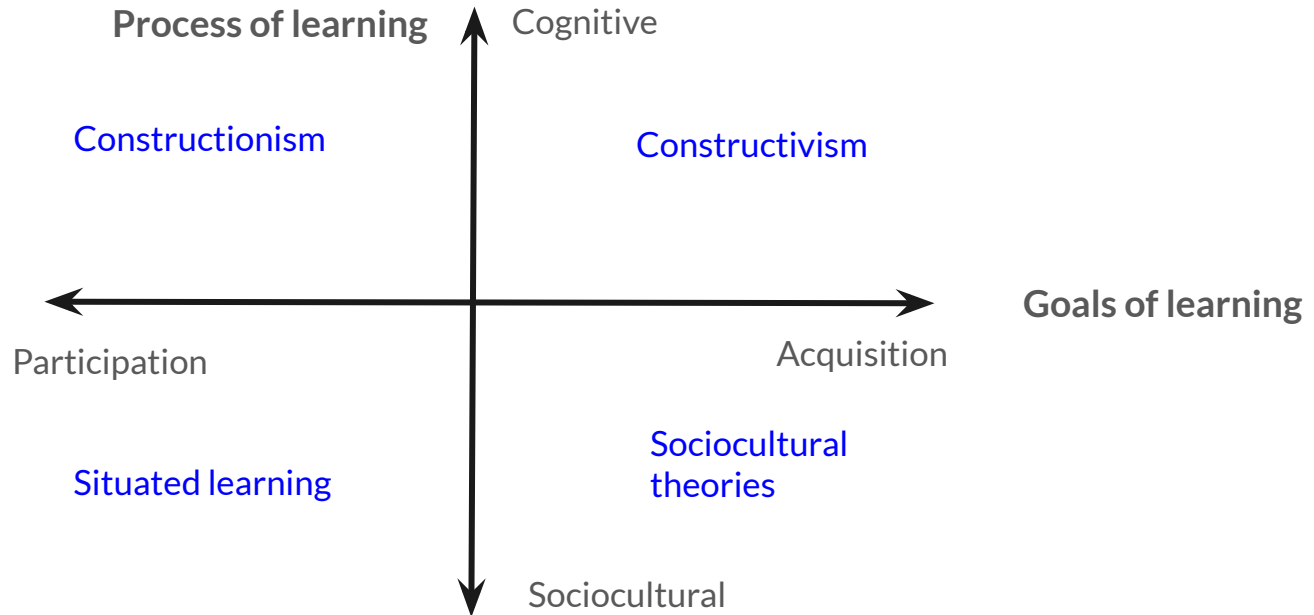# [RECAP] Share: How the two theories are connected or not.

1. Learning as active engagement is common in both
2. Both are meaning making, but constructivism is individual and social learning is in a context, and places an emphasis on identity + 1
3. Constructivism is broader and social learning theory is an extension of constructivism
4. In both the knowledge isn't objective, based on experience, social factors and participation
5. Acquisition (individual/acquisition) and participation metaphor (participation/practice)

Connections between constructivist and social theories of learning

- Social learning theory explains how we construct meaning through participation
- Constructivism explains how disequilibrium caused by new ideas or practices, leads to accomodation and then to development of competence in the practice
- Learning is viewed as an emergent in both theories
  - Goal of learning is different
  - Reflection is different - abstraction and practice
- Constructivism sees society and environment as a tool for learning, social theories see it as a tool and an outcome

Acquisition-Participation vs cognitive-sociocultural

Process of learning Cognitive

Constructionism Constructivism

Participation ← → Acquisition **Goals of learning**

Situated learning Sociocultural theories

Sociocultural

Three views of situated activity

- Cognitive plus
  - Focus on individual cognition
  - Context = physical space
  - Social, contextual factors affect cognition
- Interpretive
  - Focus on individual cognition
  - Context = physical + social
  - Meaning is negotiated through language and social interaction
- Constitutive
  - Focus on social practice
  - Context = physical + social +practice+ historical
  - cognition is constituted in relation to and in activity with the world

Practice, community and learning

- Practice is doing in a social and historical context, that gives structure and meaning to what we do
- Explicit and implicit, represented and assumed
- Practice = acting + knowing => reflective
- "Some communities specialize in the production of theories, but that too is a practice"
- Participation is a embodied, active, social, negotiated, complex process
- Learning as an emergence from a person's LPP in communities of practice.
- Learning as an interplay between experience and competence
- Learning communities allow us to acquire and create knowledge

Situating Learning in Communities of Practice

- Learning as a social phenomenon, constituted in the lived-in world, through legitimate peripheral participation in the social practice of a community
- Decentered view of the meaning and process of learning
- Changing "knowledgeable skill" subsumed in the process of changing identity in and through membership in a CoP
  - Developing an identity and becoming knowledgeably skillful are part of the same process
- Mastery is an organizational, relational characteristic of CoP

How does LPP lead to learning?

- Masters and apprentices - masters do not have a direct, didactic impact
- Organization of space and coordination among participants - "improvising"
- Learning is structured and shaped through legitimate peripheral and increasing participation
  - Centripetal movement to full participation
- Existence of broad view of the whole and comprehensive goals of learning
- Knowledgeable skill develops in the process of becoming more "master-like"
- Generating identity <-> Motivation for participation

Tensions in LPP

- The CoP must sustain itself - oldtimers must be displaced by newtimers-becoming-oldtimers, practices must continue, structural barriers to learning are deterrents to this
- Identity (individual) <-> Identity (CoP)
- Persons and CoP constitute themselves and each other
- Commodification -> subjectification of products/objects and objectification of labour/human activities -> alienation of identity
- Mastery = Identity of master plus skilled knowledgeability
- **Contradiction:** Mastery limited to activities associated with apprenticeship, but also learning happens under circumstances when identity formation and gradual mastery of knowledgeable skill are possible through participation

<u>Case study of social learning through LPP in a Makerspace</u>

- Mixed groups work on a project (first year through fourth year engineering students) making a drone
- First year students have just received training in 3d printing and laser cutting
- The group works on the project across a semester, designing, implementing, testing and revising the drone
- At the end of the semester, first year students perceived themselves to be engineers and fourth year students felt competent as engineers

Working in groups describe through words or pictures the learning mechanism that each group of students went through across the semester

Becoming a learning scientist through LPP

PostDoc:
Participation: Freedom to set the agenda for Master and PhD students
Conceptualize projects and give theoretical and methodological direction
Access to all participants and mentoring newer participants in the community
Identity: Learning scientist
Reflective practice: engagement, imagination, alignment
Meaning derived from growing the LS community

PhD Student:
Participation: As before with freedom to explore and identify new areas of research, theories, methods, directions
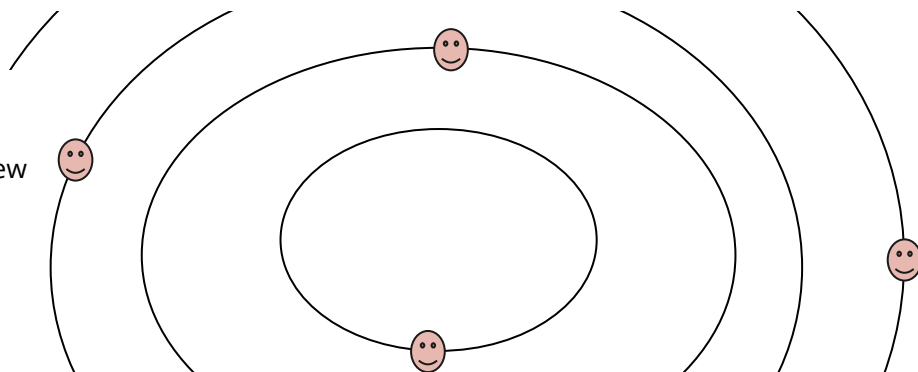
Develop connections with other nearby communities

Access to all other participants and mentoring newer participants in the communities
Identity: Learning Sciences doctoral student
Reflective practice: engagement, imagination, alignment
Meaning derived from **creating knowledge** in the LS community

Faculty:
Participation: Responsibility to set the agenda for Master and PhD students; Provide vision to the LS research
Access to all participants and mentoring newer participants in the community
Identity: Learning sciences faculty
Reflective practice: engagement, imagination, alignment
Meaning derived from exploring new research directions and growing the LS community

Project staff:
Participation: All team meetings, attend course, read papers, explore a new research area, start a small but important research project -> Mostly bringing to bear my competence in legitimate ways and through collaborations to **acquire knowledge and skills**

Access to all other participants regardless of expertise
Identity as EdTech researcher
Meaning derived from legitimate engagement with larger projects

Debrief

- Abstract/Design/Plan and model phase - old timers and newcomers come together - identities are affirmed - newcomers get an entry, get an understanding of the practice
- Specialization - distribution of labour - testing and feedback - core practice
- Coming together of subsystems - feedback - interaction of skills - identities have evolved - constructionist way of meaning making - conceptual knowledge and identity building through making artifacts
- Identities can also be changed- grow, affirm or reject - aspiring, budding, competent
- Sense of belonging - Girls/marginalized students sense grows more than boys
- Newcomers: Participation is through observation, asking questions, presenting ideas, applying prior knowledge and skills; Old timers - guiding, mentoring, skills growing, better pitching
  - Reflective practice - arranging resources in alignment with goals of project and the knowledge building, Imagination - drawing from courses
- Imposter syndrome interacting with experience?

Debrief

4th year student:
Participation: Design the artefact to address a problem and identify its subparts, make teams, assign subtasks, ensure the artefact works as a whole
Identity: Engineer/designer
Reflective practice: Examine the developing artefact, predict its performance and revise design and subtasks as necessary
Meaning derived from designing an engineering artefact and mentoring junior students
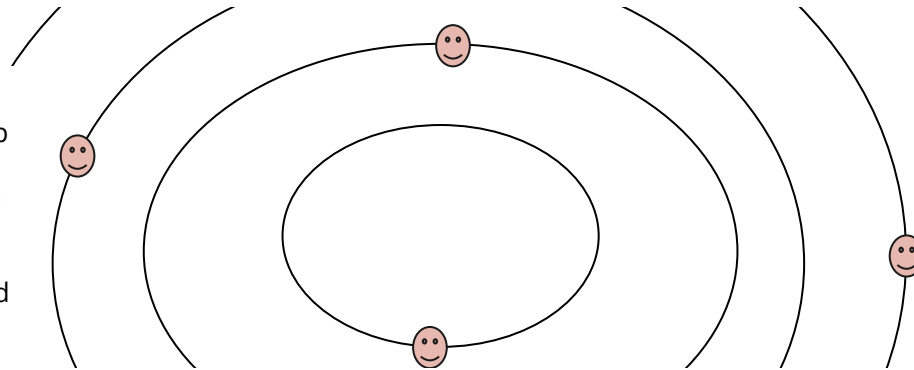
2nd year student:
Participation: Design and develop their subsystem, develop connections with other subsystem teams

Access to all other participants and mentoring first year students
Identity as competent engineer
Reflective practice: Develop their subsystem, visualize the larger artefact and how the subsystem fits there, refine the tasks for first year students
Meaning derived from designing subsystem for the project and guiding first year students

1st year student:
Participation: Attend team meetings, do the prototyping tasks assigned by -> Mostly bringing to bear their prototyping competence in legitimate ways and through collaborations to **acquire knowledge and skills**

Access to all other participants regardless of expertise
Reflective practice: Prototype objects, imagine how it fits into the larger artefact, seek feedback and align next tasks accordingly
Identity as engineering student
Meaning derived from legitimate engagement with larger projects

Facilitator:
Participation: Define the project, manage the makerspace, ensure all participants have access and achieve their performance and learning goals
Identity: Makerspace manager/ Engineer
Reflective practice: interact with students, visualize their learning paths and provide feedback and refine the project
Meaning derived from enabling students to become better engineers

Cognitive Apprenticeship

- Leveraging the power of traditional apprenticeship in the current education system for subjects such as reading, writing, math, science and social sciences
- Apprenticeship: learn expert processes of doing complex tasks, in context (real-world problems)
- Cognitive: cognitive skills
  - Need to make expert and student thought processes visible
- Differences:
  - Tasks in TA arise from workplace, in CA they are chosen and sequenced to illustrate certain practices deliberately
  - Generalizability is a focus in CA - learn skills in a wide range of settings

Framework of CA: Content, Method, Sequence, Sociology

- Content: Domain knowledge + strategic knowledge
  - Heuristic strategies - tricks of the trade
  - Control or metacognitive strategies
  - Learning strategies - knowing how to learn
- Method: making tacit knowledge explicit
  - Modeling: think aloud
  - Coaching: observing and fostering learning (overall)
  - Scaffolding: Providing supports to learners
  - Articulation: explicate their knowledge, reasoning or processes
  - Reflection: Comparing their processes with an expert, a peer, or their own model of expertise
    - Replaying performance
  - Exploration: unguided problem-solving, setting own sub-goals, asking new questions that are interesting

Framework of CA: Content, Method, Sequence, Sociology

- Sequencing:
  - Increasing complexity to include more skills and concepts used by experts
  - Increasing diversity to include a wider variety of skills and concepts
  - Global before local skills: build a conceptual model of the task before focusing on details
- Sociology
  - Situated learning: tasks as they occur in the world
  - Community of practice: Common projects and shared experiences, sense of ownership, mutual dependency and personal investment
  - Intrinsic motivation
  - Exploiting cooperation: working on problems together, motivation and extension of learning resources
    - Communities of learners: collective effort of understanding
      - Diversity of expertise, shared objective, learning how to learn, mechanisms for sharing