Intro to Learning Sciences

Lecture 17 and 18: October 14 and 16, 2025
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Where are we in the course?

- Cognitive theories and Sociocultural theories
- Role of context
- Motivations for learning are different - input vs co-emerges alongside learning

Power and Learning

- Tension -> Socially determining forces vs individual human agency
- How to study learning at the level of analysis where structure, context and agency co-constitute each other?
- *"tools, representations, artifacts, resources, practices, bodies, and the design of learning environments are all imbued with histories of power and contestation and that people creatively employ and transform these elements to reify, nudge, perturb, alter, and/or transform existing relationships of power"* -> micro, meso and macro cannot be disentangled
- *"power as the ability to alter or maintain the physical, social, structural, cultural, and political conditions, resources, and/or opportunities of individuals and collectives"*
  - Power at multiple scales - historical and structural, organizational and institutional, interactional level

Power and learning

- Individual cognitive perspective dominates - context supports learning, fades in importance once learning is achieved
- Sociocultural perspective - context inseparable from cognition and learning
- Power is relational, not in the head, circulates => Individual cognitive perspectives cannot tackle issues of power
  - Differences on the basis of class, race, gender, geography etc
  - Socially situated relations of power disappear
- Agency and constraint - exercise of power
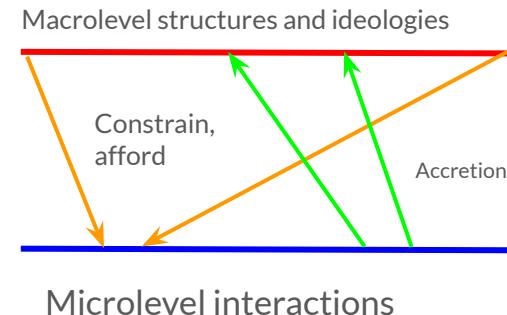
Power and SC theories of learning

1. Artefacts mediate human activity => artefacts are imbued with power
   a. language, curriculum, representations
2. Learning in everyday life => identity as social recognition
   a. control over the resources and alienation from participation
3. Learning "endures and shifts" between contexts -> Units of analysis must include context => AS rules, hierarchical divisions of power, points of conflict across multiple AS
   a. What about broad systems of power such as racism and patriarchy?
4. Multiple historical timescales of analyses => at the level of activity system cannot analyse broader systems of oppression
   a. historical systems of power and oppression embedded into mediational means such as curriculum
   b. history of the rules, div of labour, communities
   c. historical relations between AS
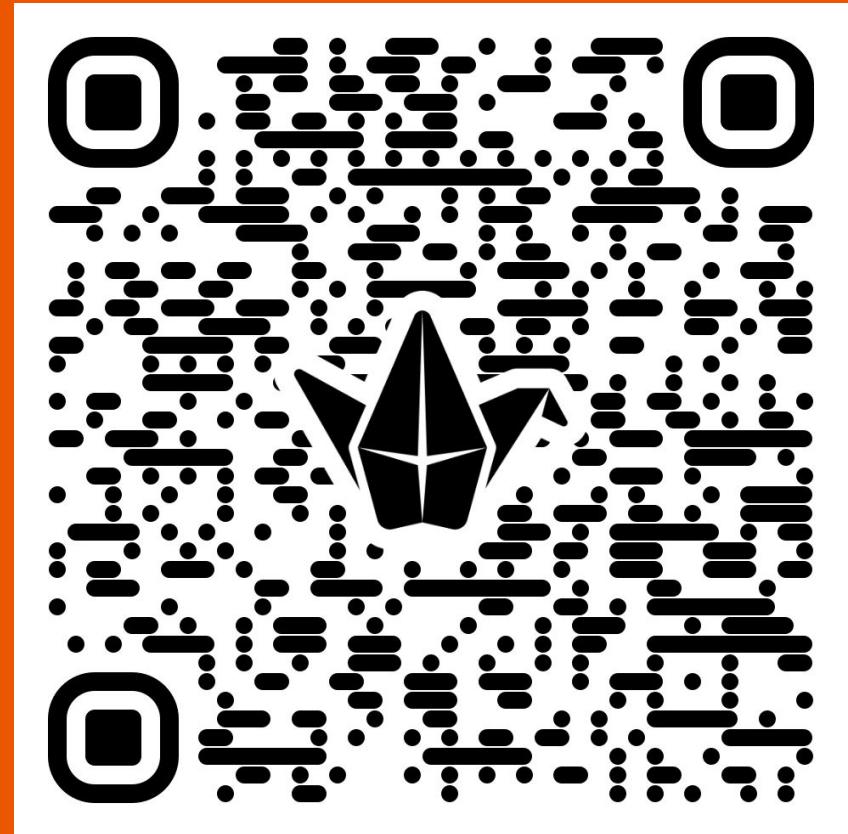
Power and SC theories of learning

5. Studying development or the processes of learning => connecting the broad historical development of systems of oppression and the moment by moment interactions of people

6. Agency and constraint => who is allowed to participate, and in what ways
    1. reflect broader social norms
    2. community norms and one's own past inform moment to moment participation
    3. Broad social institutions and systems enacted in daily interactions through repeated encounters with material and symbolic artifacts
    4. 'Figured worlds are "socially and culturally constructed realm[s] of interpretation in which particular characters and actors are recognized, significance is assigned to certain acts, and particular outcomes are valued over others'

Macrolevel structures and ideologies

Constrain, afford

Accretion

Microlevel interactions

Think about the IITGN campus and describe:

1) One mediational means that embeds a system of power
2) One form of participation that excludes and one that is designed to be inclusive
3) One identity that is or was inaccessible to you owing to a historical societal structure
4) One instance where a broad system of privilege or oppression played out in a moment by moment learning interaction

Why, despite having the "knowledge" of so many theories of learning, is our education system still the way it is?

"No oppressive order could permit the oppressed to begin to question: Why?"

- *Paulo Freire (Pedagogy of the Oppressed, 2000, p. 86)*

Freire and the Banking Concept

- Narrative education and the dominance of words
- Students as "containers to be filled" - education is thus an act of "depositing" - "Banking" concept of education - everything obviates thinking -
- *Education as the exercise of domination stimulates the credulity of students, with the ideological intent (often not perceived by educators) of indoctrinating them to adapt to the world of oppression.*
- Teacher - student (subject- object) binary, separation between humans and the world
- Students do not develop a critical consciousness
- It is in the interest of the dominant minority to have the majority adapt to their purposes
- Oppressors do not what the situation to change - marginals need to be integrated
- *For apart from inquiry, apart from the praxis*, individuals cannot be truly human. Knowledge emerges only through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry human beings pursue in the world, with the world, and with each other*

Praxis: the generative relationship between reflection and action (Vossoughi & Gutiérrez, 2016); reflection and action directed at the structures to be transformed.

Pedagogy of the Oppressed

- Going from "beings for others" to "beings for themselves" - realization upon encountering reality
- Revolutionary educator - engage in critical thinking, mutual humanization, trust in people and their creative power - partners of the students - undermine the oppressive power
- *Authentic thinking, thinking that is concerned about reality, does not take place in **ivory tower isolation**, but only in **communication**. If it is true that **thought has meaning only when generated by action upon the world**, the subordination of students to teachers becomes impossible.*
- Liberation is a praxis - action and reflection to transform - present as dynamic, education as a revolutionary futurity
- Problem posing in relation to the world - being conscious of things and self - dialogue
- *It is a learning situation in which the **cognizable object (far from being the end of the cognitive act) intermediates** the cognitive actors—teacher on the one hand and students on the other. (…) Here, no one teaches another, nor is anyone self-taught. People teach each other, mediated by the world, by the cognizable objects which in banking education are "owned" by the teacher.*

Problem-posing education

- The teacher learns in dialogue with the students, and the students teach while being taught - joint responsibility
- *Problem-posing education affirms men and women as beings in the process of becoming. (...) The unfinished character of human beings and the transformational character of reality necessitate that education be an ongoing activity.*
- Role of the teacher is to create conditions in which knowledge is at the level of reasoning and judgement
- Students pose problems relating to themselves and the world - they are challenged - interrelated to other problems in the context -> critical thinking and lack of alienation - response evokes new challenges and new understandings - regard themselves as committed
- Power to perceive critically the way they exist in the world (with which and in which)

Problem-posing education

- Banking education as mythicizing reality and problem posing as demythologizing
- Based on creativity and stimulates true reflection and action upon reality, takes people's histories into account
- Begin from the reality in which people "are submerged, from which they emerge and in which they intervene"
- Perceive the situation not as unalterable, but merely as limiting, a challenge
- Deepening awareness, understanding of the situation, recognition of it as a reality that can be transformed
- Resignation -> drive for transformation, develop a sense of control
- *Any situation in which some individuals prevent others from engaging in the process of inquiry is one of violence.*

[PAIR ACTIVITY]: Hypothetical Excerpt from a science lesson

Teacher: Today we're learning about climate change. Who can tell me why the Earth is getting warmer?

Student 1: Because of pollution?

Teacher: Not exactly. It's because of greenhouse gases — carbon dioxide and methane — trapping heat.
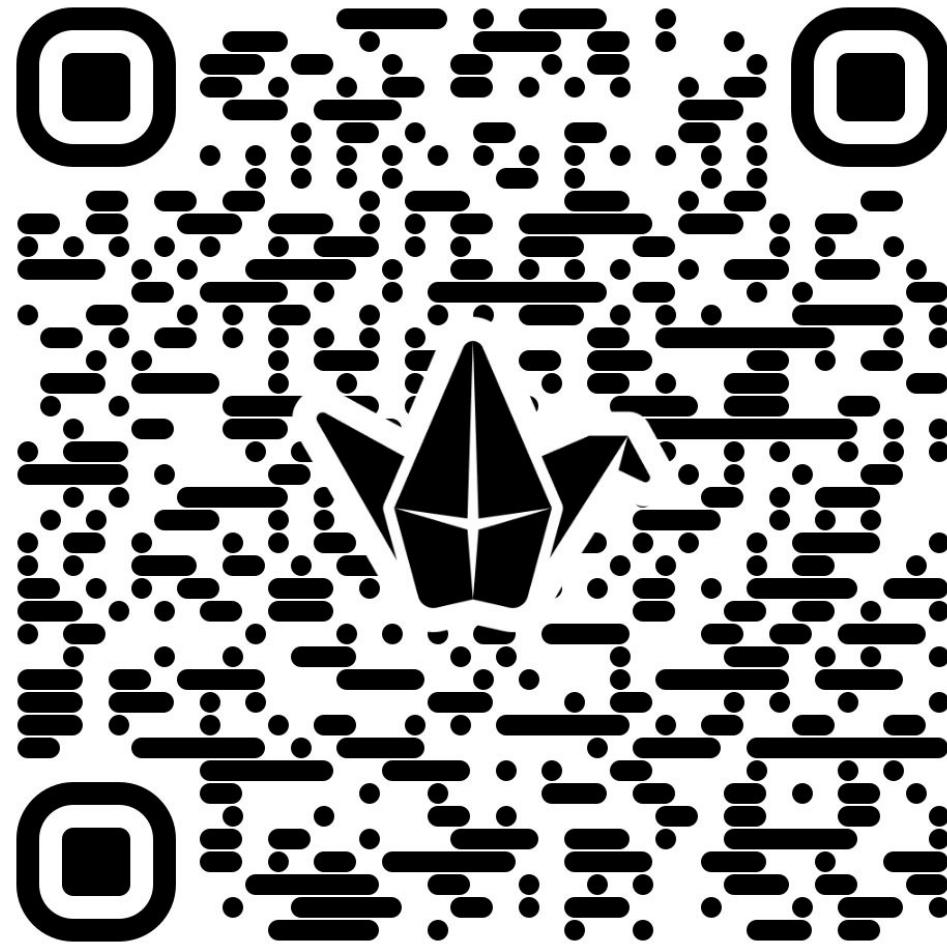
Student 2: My uncle says it's just natural. The climate always changes.

Teacher: That's a common misunderstanding. Scientists have proven it's caused by humans. Let's move on.

Student 3: But I saw a video online that said—

Teacher: We'll talk about sources later. For now, write down the correct causes in your notebooks.

Oppression

- Exercise of power
- Malicious intent
- Excessive cruelty
- Prevented from having opportunities
- Unjust
- Perhaps discriminatory

Think: Is oppression still oppression if it's good for you? (Individual, 3 min)

https://docs.google.com/forms/d/e/1FAIpQLSdFJNZrftNG3o4YgHl5M9Zrb6vDrl88rSC-e3y4t4-ei76Jrw/viewform?usp=sf_link

Groups: Pair up with someone who has an opposite opinion. Discuss your opinions and further answer, is the educational system oppressive? (Pairs or groups, 5-7 min)

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Share with the class:

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Problem-posing education and their connection to Vygotsky's theories

- Simply replacing the *content* of teaching (from power to counter-power ideas) does not unsettle the ideas that sustain an unequal society - practice in classrooms is important
- Goal of education is developing tools to analyse and transform the world through social action
- Central role of praxis - continual movement between reflection and action
- How we teach is just as important as what we teach
  - Organization of learning, social relations, mediating forms (curriculum is one of these)
- Focus on how social relations are constituted, how power and ideologies are present in practices, how tools limit or expand opportunities and how students develop as thinkers and actors
  - Language mediates and transforms human activity

Problem-posing education <-> Vygotsky's theories

- People are social and historical beings - individual thought and action is inextricably linked to sociocultural contexts
- Learning is organized around imagining a nascent version of the future - "proleptic visions" - hope and possibility become materialized
- Going from ingenuity (pure experience) to critical thinking (rigorous methodological procedure)
  - Curiosity that criticizes itself -> epistemological curiosity
- Consider the intellectual resources students bring to the classroom - conscious reflection recognizing the persistent tensions between word and deed - continuous development
- Genuine sense-making is non-linear and often vulnerable - limit the heavy-handedness of theory - recognize moments of "productive tensions" and use them as a resource for learning - All participants step in and out of dominant forms of thinking
- Avoiding "acceptable criticality"

Problem-posing education and their connection to Vygotsky's theories

- Pedagogical and cultural mediation is generative, between history and student creativity
- Role of teacher is to organize the learning environment, develop a sensitivity to moments when novices are ready to take more responsibility or when students dissent opens up new solutions
- Teacher is also an authority on the subject matter, but the key is that the teacher must use this expertise in equitable and respectful ways making any activity a truly "joint, mediated activity"
- Interplay of structure and creativity, objectives must be generative, have contradictions, transcendable
- Teachers must challenge the reproduction of social hierarchies, intentionally guide collective activity towards humanizing possibilities
- Syncretic learning - breaking the boundaries between home/everyday and school/scientific
  - Support learners in entering into and transforming disciplinary practices to create a more just world

The dynamic construction of power, identities, ideology and learning

- Micro-identities - multiplicities and variability
- Identities as constituted in and remade by interactions and participation in cultural practices
- Ideological expansion and convergence
- Co-construction of disciplines, alignment with dominant representations of race and gender in science and math
  - Co-construction of identities wrt these disciplines - masculine science
- Dynamic processes through which identity and ideology are co-constructed
- "Micro level interactions have the potential to sediment into more durable identities over time."
- Power shows itself in interaction
- Rather than focusing on changing macro identities of students or stable ideologies of teachers and students, focus on the interactions between participants that lead to emergence of micro identities and microcontestations of ideology
- Local constructions that are strong enough to resist dominant ideologies
- Discourse can constrain or enable certain positionalities
- Classroom organizational, ideological, interpersonal structures narrow construction of "goodness"

Attending to the organization of a learning environment

- Physical space - masculine arrangement in museums
- Organization of the learning environment can exclude certain kinds of learners
- Structure of shared local activity - collective meaning making that emerges from everyday practices
- Organization and interaction of different sites of learning
- Relationship between teacher and student can change the activity system
- Are teacher-student interactions, tools, structure of activity reifying existing caste and class divisions? - power in interaction allows students to position themselves or get positioned along multiple axes
- Shifts in activity system allows for emergence of different positionalities and possibilities - balance of power opens up new avenues for participation - science classroom vs robotics competition
- Designing instructional encounters to bring into contact different perspectives to generate different disciplinary ways of seeing - indigenous ways of knowing
- Organize learning environments to expand what is possible for a learner
  - Normative practices reinscribe inequalities

Leveraging and repurposing tools

- Tools and representations are embedded with power and politics - affordances and limitations of mediational tools for certain students explain the construction of types of power such as ability and disability
- Tools are sites where macro categories and constructs are intertwines with micro level interactions
- Disciplinary meaning making about data connected to students understanding of themselves and about systems of power - similarly agent-based simulations
- Standard instructional representations are inaccessible to students with MLDs - co-design - expand learning opportunities
- Use of tools open up opportunities to learn and access leadership positions
- Also discursive tools such as argumentation
- Power asymmetry between teacher and student using language markers - tone and tempo, and characteristics of speech - revoicing
- Co-developing tools or habits of mind that deepen collective analysis of problems

Summary

- Attending to and foregrounding variability in learners' identities and their ideological stances.
- Establishing links between moment-to-moment variability in learners' identities, the ideological stances they take, and the forms of relative durability in these constructs over time, place, and settings.
- Emphasizing the co-construction of power, identity, and ideology through participants' interactions, and how disciplines such as mathematics and science are co-constructed as ideological (racialized, gendered, classed, etc.) through interactional processes.
- Examining how dynamics of power, identity, ideology, and disciplinary sense making are afforded or constrained by (a) the design of the learning environment, (b) the propensities of architecture and infrastructure to promote particular interactions, and/or (c) the relationships that are likely and that are possible in a setting.
- Seeking an understanding of the continuities and discontinuities of identities and ideologies in learners' lives across multiple sites.
- Analyzing how representational and discursive tools are used, contested, and/or repurposed by learners as they negotiate powered relationships.