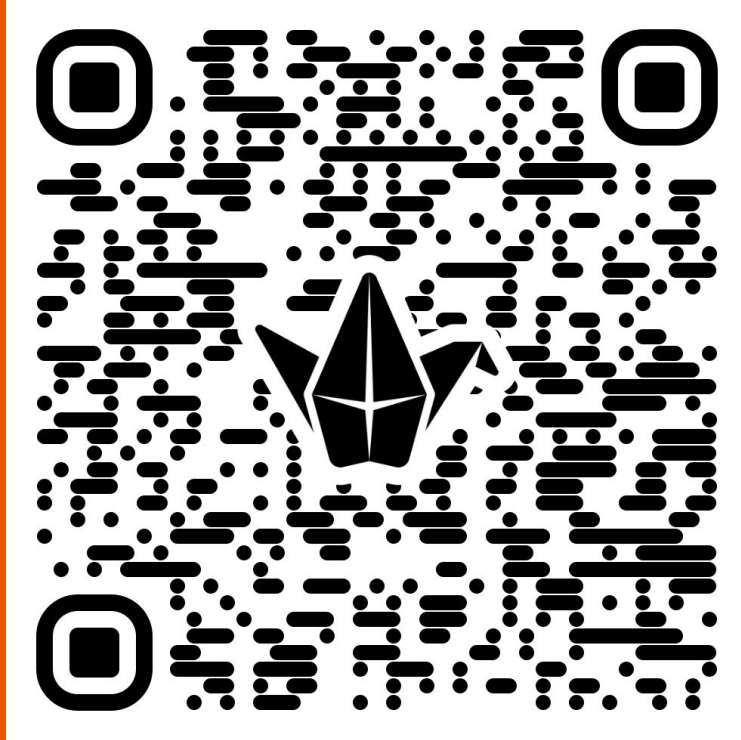# Intro to Learning Sciences

Lecture 21, October 28, 2025
Aditi Kothiyal

Think - Pair- Share: Experience and thought

Debrief:
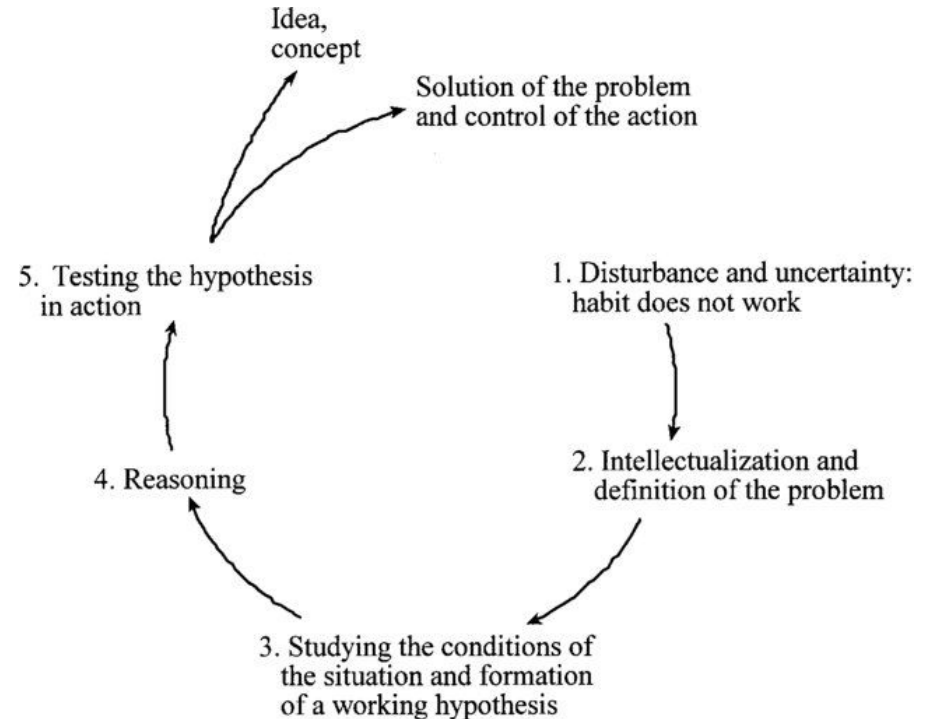
1. New understandings:
   a. Technology and a city - notion of a city and technology itself - equating modernity with technology failed
   b. Modernism and traditionalism mixes - define each - traditional practices which have become modern - the two concepts can merge
   c. Examination for the sake of categorization -> examination is less time consuming, teacher training is insufficient, alternate methods of assessment available
   d. Social media gives us control over what we choose to express ->Social media comm is limited, can't fully experience, Makes real world relationships suffer -> multiple ways/issues
   e. Compare lifestyles/human tendencies
2. Processes which led to shift in thinking:
   a. Discussion - conjectures about the situation - verified with prior experiences/data
   b. Unsettled existing proposition - reflection on existing experience

Think back to what Dewey said.

- Experience from doing hands-on things, problem solving
- Thought comes from building on experiences
- Thinking is a process of inquiry - five steps
  - Perplexity - doubt, confusion
  - Conjectures - first guess
  - Define the problem - better understand through survey
  - Tentative hypothesis - more refined conjecture
  - Testing

Dewey's reflective thinking model

Idea, concept

Solution of the problem and control of the action

5. Testing the hypothesis in action

1. Disturbance and uncertainty: habit does not work

4. Reasoning

2. Intellectualization and definition of the problem

3. Studying the conditions of the situation and formation of a working hypothesis

Miettinen, R. (2000). The concept of experiential learning and John Dewey's theory of reflective thought and action. *International journal of lifelong education, 19*(1), 54-72.

Thinking in Education

- Purpose of school - develop capacity to think
- Thinking for action, and for learning about ourselves and the world around us
- No skill w/o thought and no information w/o thoughtful action
- Instruction should create conditions which "exact, promote and test thinking"
- First step of thinking is experience
- Experience must not be assumed - provide an actual empirical situation as the initiating phase of thought
  - Out of school situation, which interests and engages in ordinary life
- First stage - trial and error - interaction with material and note what happens - "unscholastic"
- Doing has to demand thinking, noting of connections - neither routine nor random - new, yet connected to what is known so as to get an effective response
  - Response from which the consequences can be mentally connected to what is done

Nature of Problems

- Quality of problem - observation and engagement outside of school - personal problem - stimulate and direct observation of connections, inference, testing
- Layout of classroom not conducive - listening and reproduction
- Context of experience - problems must naturally present themselves
- *"And where children are engaged in doing things and in discussing what arises in the course of their doing, it is found, even with comparatively indifferent modes of instruction, that children's inquiries are spontaneous and numerous, and the proposals of solution advanced, varied, and ingenious."*
- Students problem is to satisfy the requirements of the teacher - connection to material indirect - she is studying the norms of the school system, not the subject matter itself

Data for thinking

- Material of thinking - actions, events, facts, relationships - data
- Difficulty as stimulus to thinking
- Difficulty must be similar to already encountered situations - control
- Difficulty large enough to challenge thought, small enough so that useful suggestions can emerge from the familiar parts
- Going over past experiences, utilizing the experiences of others
- Knowledge as "working capital" not the end goal, resource for learning new things
- Students need to learn how to sort through information to identify what is appropriate <-> inert knowledge

From data to ideas

- Observation and connection to existing knowledge - what is known and what needs to be found
- Data -> suggestions/inferences/ideas -> decide appropriateness based on data
- Suggestions -> predict what should happen, what one must do -> a leap, inventiveness
- Familiar in some context, inventiveness lies in applying in a new situation
- *"The educational conclusion which follows is that all thinking is original in a projection of considerations which have not been previously apprehended."*
- No idea can be **conveyed** from one person to another -> it may stimulate a similar idea
- Thinking is wrestling with the problem and finding a way out

Educational implications

- *"When the parent or teacher has **provided the conditions which stimulate thinking** and has taken a sympathetic attitude toward the activities of the learner by entering into a common or conjoint experience, all has been done which a **second party can do to instigate learning**. The rest lies with the one directly concerned. **If he cannot devise his own solution** (not of course in isolation, but in correspondence with the teacher and other pupils) and find his own way out he will not learn, not even if he can recite some correct answer with one hundred percent accuracy."*
- Teachers role:
  - Not to give ideas, but to see to it that the learner engages in activities and generates her own ideas
  - Participation/sharing in such an activity
  - Teacher is a learner and vice-versa, lack of consciousness or hierarchy

Role of ideas in learning

- Anticipations of connections between an activity and a consequence
- Mediators to learning
- Without experience, they are suggestions that may help in certain experiences
  - Need application/ testing to become real and clear
- Application and connection with real life

Group Activity: Consider 8-10 year olds making a tall tower out of blocks. They decide to do an impromptu competition where the most stable design will win. Stability is decided by shaking the table (like an earthquake). The children come up with their own rules for the most stable design. Analyse this case through the lens of Dewey's inquiry learning and identify what learning process would be "productive" for developing useful knowledge as Dewey puts it.
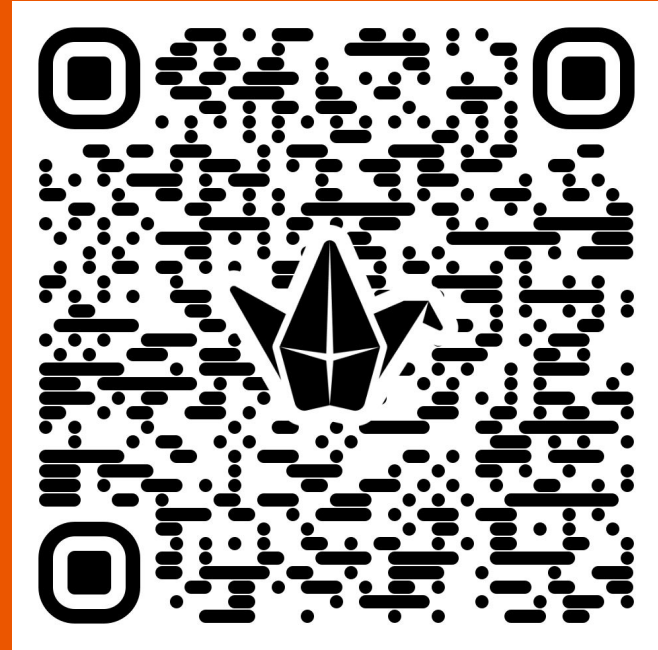
Debrief

1) Draw from experience of playing games *pithu* - opposite goals
2) Bias in shaking - discover rules while eliminating bias -internet resources- rules through discussion, minimum height, maximum base area - hypothesis - shaking (testing)
3) Conjectures about others approaches - discuss - common ground rules
4) Learn from each other - observe others structures - Discussing - problem understanding - build conjectures
5) Start with things that don't work - tables are very stable (familiar experience)- four legs, make it very tall - other things as familiar experience - artefacts of each iteration which are neither beneficial or harmful
6) Repetition - multiple hypotheses lead to better design